
United States
Circuit Court of Appeals

For the Ninth Circuit.

SILVER LINE, LIMITED, Owner and operator of the British Motorship "SILVERPALM", and the British Motorship "SILVERPALM", her engines, tackle, apparel, furniture, etc.,

Appellants.

vs.

UNITED STATES OF AMERICA, Owner and operator of the Cruiser "CHICAGO", UNITED STATES OF AMERICA, ETHEL G. MAC FARLANE, as Administratrix, MARIAN B. CHAPPELLE, as Administratrix, JOSEPH A. OEHLERS, LOUIS GIARD, and BANK OF AMERICA NATIONAL TRUST & SAVINGS ASSOCIATION, as Special Administrator,

Appellees.

Apostles on Appeal

In Three Volumes

VOLUME II

Pages 577 to 1152

Upon Appeal from the District Court of the United States for the Northern District of California,

Southern Division.

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(Testimony of Ernest Bradford Colton.)

The COURT: Q. So far as you know?

A. I say that my estimate has nothing to do with any orders from the Navy Department.

The COURT: At this time we will take a recess until two o'clock.

(A recess was here taken until 2 o'clock p. m.)
[423]

Afternoon Session

ERNEST BRADFORD COLTON

recalled

Cross Examination Resumed

Mr. LILLICK: Q. Mr. Colton, can you tell me what the size of the turbines are on each engine, that is, by diameter, how high they stand?

A. I can give you a picture of that.

Q. I much prefer that.

A. This may help you. I have a pack of the plans also that may give more detail.

Q. I do not care for the details, I only wish the size.

A. This is to actual scale. High pressure turbine, 12 feet long approximately.

Q. How high?

A. Seven feet in diameter roughly, as near as I can estimate.

Q. That would be seven feet from the periphery at the wheel to the opposite side?

A. Approximately.

(Testimony of Ernest Bradford Colton.)

Q. That was the high pressure turbine was it not?

A. Yes.

Q. What was the size of the low pressure turbine?

A. The length is the same, the diameter is about 12 feet.

Q. The two turbines are so arranged that they must be used separately, or are they both used together?

A. When you open the throttle for the ahead you turn the steam on the high pressure and low pressure simultaneously on that particular engine.

Q. When you start to reverse?

A. You close off the steam to the high pressure and low pressure and insert steam in a new turbine, which is the astern turbine.

Q. May I take the example that you have just given me as an example of the turbines that were attached to each separate propeller?

A. Yes.

Q. What is the weight of the entire revolving mechanism that revolves when the steam is turned into both high and low pressure for forward motion?

A. I could not say. [424]

Q. Your best estimate of what it is.

A. I would not even be able to estimate. That can be gotten from the Navy Yard at Mare Island very quickly.

(Testimony of Ernest Bradford Colton.)

Q. You have seen the turbines of course many times, haven't you?

A. Yes.

Q. And as you have seen them can you not give me an estimate of the weight of the material going into the turning elements of the turbine?

A. I could not, I am an operating engineer and not a design engineer.

Q. So that only a designing engineer would know that?

A. Yes.

Q. Would you say that the rotating gear would be as heavy as 15 tons?

A. I would not make any estimate on the weight.

Q. Surely you could estimate whether it is one ton or twenty tons?

A. I would not care to make an estimate. I wouldn't put a figure down that I have not any idea as to whether it is right or not. I could get you the information if you wish.

Q. I would like to have it. Perhaps Miss Phillips will give it to me from what you inform her the weight of one of these is.

A. Propellers?

Q. Propellers, counting the weight of everything from the end of the propeller shaft, the entire steel and metal revolving mechanism involved in the propeller, from the turbine to the propeller, in the forward motion.

A. Very well.

(Testimony of Ernest Bradford Colton.)

Q. Will you tell me what the maximum revolutions are of the propellers going full speed astern at 20 knots on the "Chicago"?

A. It is roughly 240 revolutions, probably 250. I would rather say 250.

Q. Would that same number of revolutions apply when going full astern from an 18-knot standard speed?

A. Full speed astern is 110 revolutions. [425]

Q. You say to give it emergency full speed astern from 18 knots ahead?

A. We could not get over 190 revolutions astern.

Q. Mr. Colton, you said this morning that the revolution counter record showing the number of revolutions the various propellers were making at the even hour was recorded on the "Chicago"?

A. Yes.

Q. Does the recording of that fall within a duty of one of the men on watch at the even hour?

A. Yes.

Q. Who does that?

A. If the throttle man is not answering the signal he would normally do it.

Q. On the morning of the collision Kershaw was, as I understand it, the officer in the after engine room? Was he the man who would have made that record?

A. No, there are four men that had to take that record, there are four different counters.

(Testimony of Ernest Bradford Colton.)

Q. So that the four different throttle men would make that entry?

A. If they were not answering a signal at the time.

Q. How is that taken down? Does Kershaw go from one to the other and then record it on his sheet from what they tell him?

A. No, they record it on a sheet themselves.

Q. On the ordinary bell book sheet, or on some other?

A. No, on that main engine data sheet which you have there, or that is in the court room. That is the sheet.

Q. You are referring to the sheet that I hold in my hand?

A. Yes. Here are the readings.

Q. In calling your attention to these readings on these various sheets, am I right in believing that they are on No. 4 engine in the same handwriting?

A. No.

Q. Then will you tell me where one handwriting ends and the other commences?

A. I cannot tell you that. I can only tell you the throttle men make these counter readings, and this sheet is taken around the engine room and the other men in the watch fill in these entries. [426]

Q. But as to each entry on the even hour the throttle man himself makes the entry?

A. He would normally make the entry if he was not busy with something else.

(Testimony of Ernest Bradford Colton.)

Q. You don't know whether on this morning, Smith at one throttle, Cumbie at another, Wommack at another and another man at the fourth, made them?

A. No, I was not in the engine room.

Q. When you came down to the engine room a few minutes after the collision you went directly to the aft engine room?

A. Yes, that is the control engine room.

Q. Was there a man by the name of Haynes there, do you know? Do you remember him?

A. I do not recall. I believe he was, I am not sure.

Q. You know that because you have been told since the collision Mr. Haynes was in the after engine room?

A. I immediately made a list of the men that were actually on watch at the time of the collision. I can refer to that and tell you whether he was there.

Q. Will you please?

A. His name does not appear on my list.

Q. As I understand the list to which you refer, and which you are holding in your hand, was made by you at that time?

A. It was made under my direction.

Q. And approximately at what time that morning?

A. About 8:45 roughly.

Q. So that the sheet made up at 8:45 by someone else does not indicate whether Haynes was there between 8 and 8:06?

(Testimony of Ernest Bradford Colton.)

A. It does not show him as having been on watch at that time.

Q. Where did you get the information that Haynes was in the engine room at the time of the collision?

A. I did not say that Haynes was in the engine room at the time of the collision.

Q. I misunderstood you. Do you know whether he was in the engine room?

A. I don't know.

Q. If he was there with the engine room crew that you then had, he [427] had no business there, had he?

A. I would not say that.

Q. When did Haynes leave the "Chicago" do you know?

A. I don't know.

Q. Do you know why he left the "Chicago"?

A. I don't know. We have 186 men, roughly, in my department, and I do not keep track of their going and coming.

Q. Who would know about the record of Haynes?

A. The executive officer on the ship.

Q. And the executive officer is whom?

A. Commander Brereton.

Miss PHILLIPS: I would be very glad to produce any records about Mr. Haynes that Mr. Lillick wants. Several witnesses have testified about the time he left and whether his term of enlistment expired. If you want the exact date on which he left I

will be very glad to get it, but I think there is a good deal of time being wasted asking witnesses who do not know the details apparently that Mr. Lillick wants.

Mr. LILLICK: I have in mind that one of the three men who was in the engine room—and I may be in error about this—left the ship because his term of enlistment expired and the other man on the port lookout testified one of them left because his term of enlistment expired, and another man who was on the port lookout or starboard lookout, one of those men, I understand left the ship not because his term of enlistment expired.

Miss PHILLIPS: The man on the starboard lookout, the port lookout testified, was discharged. Several witnesses have testified that Haynes left because his term of enlistment expired. If you want any more detail I will get it.

Mr. LILLICK: I do not care for any more.

Q. Mr. Colton, I would like you to, if you will, follow this question closely. I want you to assume from the time the full astern order was given until the time of the collision, the "Chicago" ranged ahead 272 [428] yards; what speed would you say she was going at at the time that full astern order was given?

A. Might I ask you if you are assuming that the "Chicago" had become dead in the water when she stopped?

Q. No, that is a very proper question. Let us assume that at the time of the collision the "Chi-

(Testimony of Ernest Bradford Colton.)

ago" was making approximately four knots an hour, and that from the time the full astern order was given until the time of the collision she had ranged ahead approximately 272 yards. What speed would you say she was going at the time the full astern order was given?

A. What is the time interval there, I will have to have that.

Q. The time interval as you remember it, from when you heard the full astern order, and the collision.

Miss PHILLIPS: I beg your pardon, the witness did not testify he heard the full astern order.

Mr. LILLICK: Q. Did you not hear the full astern order?

A. No, I did not say that I heard the full astern order.

The COURT: You said you heard the siren?

A. I heard the siren and then the word "Collision".

Mr. LILLICK: Q. Let us assume that the full astern signal was given at one minute before the time of the collision.

A. I would figure the ship was making, on those assumptions, 15 knots through the water, if she was making four knots when she was struck, and made only 273 yards in one minute.

Q. This morning you gave us some estimate as to the time within which the ship could be brought

(Testimony of Ernest Bradford Colton.)

to a stop at certain speed. If you assumed that the "Chicago" was going through the water at 15 knots an hour, and a full reverse signal was run in the engine room, figuring that time from the time the signal was received in the engine room, how long would it take to bring the "Chicago" to a stop in her condition that day? [429]

A. This was a full astern, not an emergency astern?

Q. Emergency full astern.

A. My estimate of it would be one and a half minutes.

Q. You have never tried that and timed it have you, on the "Chicago"?

A. Not emergency full speed. We have only tried it for full speed astern, two minutes.

Q. Is the "Chicago's" engine room equipment so attached that both the high and low pressure can be put upon all of the propellers for a full astern signal?

A. That question is not clear to me. I *can* get what you mean.

Q. Let me reframe it in order that you may understand what I mean. I want to know whether, to put the four propellers on the "Chicago" in full reverse, you attach both the high and low pressure turbines?

A. We do not. To put the "Chicago" in reverse we use only the astern turbine, which is a single turbine separate from the ahead turbine.

(Testimony of Ernest Bradford Colton.)

Q. What, with relation to the high pressure and low pressure, do you use? I am not an engineer, as you can well see by my questions, and I want to find out.

A. The full ahead pressure of steam of approximately 300 pounds goes directly into the astern turbine.

Q. Is it connected with only the low pressure turbine or both the low pressure and high pressure?

A. There is no high pressure or low pressure astern turbine. It is a single turbine and takes the full volume of steam. It is different from going ahead. In going ahead we have both high and low pressure turbines.

Q. In other words, there is a disconnecting equipment, is there? It runs on the same shaft?

A. The same shaft turns right through the reduction gear.

Q. I am not sure that you were asked what the lag in the speed of [430] the engines means. Can you tell me what it does mean?

A. You mean the lag of the speed of the engines behind the speed of the ship? Is that what you are referring to?

Q. Yes.

A. The propellers have to be going faster than the ship in order to increase the speed of the ship. The speed of the ship through the water when the ship is going ahead, when increasing the speed, the speed of the ship through the water would lag behind the speed of the propeller.

(Testimony of Ernest Bradford Colton.)

Q. And then the propeller, in the reverse motion would correspondingly, before it brought the ship to a stop, and after she commenced to back, would still lag behind, in the same fashion as going ahead?

A. The propellers would be going in the opposite direction and have the opposite effect.

Mr. LILLICK: That is all.

Redirect Examination

Miss PHILLIPS: I have just a few questions, Mr. Colton, does the time out of the dry dock make any difference in the time required to stop the ship in the water?

A. A ship going ahead and given a stop bell will stop quicker if the bottom is foul than it would if the ship had just come out of the dock.

Q. How many hours had the "Chicago" boilers No. 5 and 6 steamed since the cleaning?

A. Since the last cleaning?

Q. Yes.

A. Prior to the collision up to getting under way the day before, it was 44 hours, and then adding 23 hours to the time of the collision it would make 67 hours.

Q. How long can you run boilers before they have to be cleaned?

A. The engineering instructions call for 700 hours maximum.

Q. Are the written instructions by the department of engineering of the Navy as to the entries in the bell book, mandatory, or directive? [431]

(Testimony of Ernest Bradford Colton.)

Mr. LILLICK: Just a second, I object to that as purely a conclusion of the witness, your Honor.

Miss PHILLIPS: May I be heard on that?

The COURT: Yes.

Miss PHILLIPS: The rule of this court has always been, I mean in this court here, that the interpretation of instructions by a department of the Government having the enforcing of those instructions is admissible in evidence. That question, if your Honor please, was raised in the Behring Sea sealing cases, which were tried before your Honor. The question as to what interpretation was placed in the instructions by the Department was held admissible in evidence in those cases. I can get your Honor's ruling on it, but I am quite positive that that rule has been followed repeatedly. In addition, the Departmental construction of regulations is admissible in evidence, which your Honor has had raised in the tax cases.

Mr. LILLICK: May I have a word? My objection runs to the question asked this witness of whether it was mandatory or directive. If this witness should say it is mandatory, it would be based on instructions received by him, and he is not shown to be in a situation to say whether his instructions were mandatory or directive.

Miss PHILLIPS: I do not believe counsel has understood the question.

The COURT: I believe he can express his opinion on that.

(Testimony of Ernest Bradford Colton.)

Miss PHILLIPS: I will reframe the question.

Q. In construing the written instructions of the Department of Engineering as to entries in the bell books, what construction have you placed upon those written instructions, as to whether they are mandatory or directive?

A. I would answer, directive.

Q. Directive?

A. Yes.

Q. Are those instructions signed by anyone?

[432]

A. They are not, they are in written form.

Q. You have stated that if a member of your staff disobeyed an order which he should have obeyed, you subject him to discipline. I believe you stated that this morning. Do you regard errors in bell book entries as disregarding of orders?

A. I do not.

Q. Have you ever subjected a man of your staff to discipline for errors in bell book entry?

A. I have not, and never will.

Q. Have you ever punished or disciplined a man for making an erasure in bellbook entries?

A. I have not.

The COURT: Of course that is where you determined he did not do it deliberately?

A. Deliberately.

Q. He made the entries and, in your opinion made an error, that is all?

A. Yes.

(Testimony of Ernest Bradford Colton.)

Miss PHILLIPS: Q. Why don't you discipline a man who make an error and did not make an intentional error?

A. We all make mistakes.

Q. What is the difficulty, if any, in getting exact counter readings?

A. The counter is changing all the time, at 18 knots, one of these digits at least will be changing three times a second. At some time all six would be changed simultaneously. It is very difficult to look at figures that are moving and read them instantly.

Q. How many digits show on the counter?

A. Six.

Q. Why, then, are there such records kept, as far as you know?

A. My opinion is that they are kept for the convenience of the Bureau in working out the performance of the ship as far as her standing in engineering competition, and we give them as much data as we possibly can for that purpose.

Q. The engineering rough log was offered in evidence, and it was kept by Mr. Kershaw?

A. Yes. That is the smooth log.

Q. Mr. Birchmire made some reference, I believe, to a rough log which he kept. I think he said he turned it into the engineer's [433] office. Have you got it?

A. It is aboard the ship.

Q. Can you send it down to us?

A. I can.

(Testimony of Ernest Bradford Colton.)

Q. Very well, I will attend to that, counsel, I think I can get it tomorrow. Mr. Colton intends to get to the ship tonight. Mr. Colton, with 27,000 horse power, available for going ahead, not all in use, what would you say as to the capacity of the "Chicago" to back full astern?

A. It should be up to 14 or 15 knots engine speed in one minute, that is engine speed.

Q. What would you say as to the calculations at which the engines could begin starting astern if 27,000 horsepower is available and not all in use at the time the order was given?

A. The more horsepower that is available, the quicker you can start going astern.

Q. What size sprayer plates were in use that morning in the engine room at 8 o'clock?

A. The largest that we have.

Q. What is that size?

A. That is called size 3008.

Q. Can you state the capacity of one boiler with these plates on in use to make steam?

A. Yes, in one minute, we take three thousand pounds of water and convert it into steam at three hundred pounds pressure in one minute.

Q. That is on one boiler?

A. Yes.

Miss PHILLIPS: That is all.

(Testimony of Ernest Bradford Colton.)

Recross Examination

Mr. LILLICK: Q. How do you distinguish between mandatory and permissive instructions in the Navy?

A. I did not hear the word "permissive."

The COURT: Mandatory or directive.

A. Directive is the word I understood.

Mr. LILLICK: Q. How do you distinguish between mandatory and directive instructions?

A. Mandatory instruction is given either point blank or when it is an order that allows no discretion in carrying out, you must carry it out. A directive order is [434] if the captain said "We will get away at 10 o'clock tomorrow morning", I would be ready to get under way at 10 o'clock tomorrow morning. If he said "Make as much speed as you can to get ready" that would be a directive order. With a mandatory order I would have no discretion in using my judgment. The decision has been made. Is that clear?

Q. Yes. You say the instructions on the engineer's bell books are directive, as I understand you?

A. I assume that they are directive.

Q. That was your own assumption?

A. Yes, that it is an instruction.

Q. Notwithstanding the fact that on each sheet of the bell book there is this language, "Alterations or erasures are not permitted, necessary corrections shall be made by notes written across the black lines of the record", and that language in heavy type, you feel that the instructions are directive?

(Testimony of Ernest Bradford Colton.)

A. It says "instructions", not "orders." I say it is directive.

Q. So that you distinguish between mandatory and directive because the mandatory instructions are orders, and the directive instructions are labeled "instructions"?

A. In this particular case, yes.

Mr. LILLICK: You do not want us to understand that the erasures on these log book sheets such as these are usual and customary, would you?

Miss PHILLIPS: That whole log is in evidence, your Honor. I think your Honor can refer back to entries before the hour and after, and see whether or not correction on the bell sheets was a customary thing during a four hour watch. I think if counsel will examine that he will see that before 8 o'clock here and there there are erasures and smutty finger marks, and the like.

Mr. LILLICK: I am not talking about smutty finger marks at all. I am talking only of erasures. I am not insisting upon an [435] answer to that question and will ask another.

A. I am ready to answer any question. I have no objection to answering any question.

The COURT: It is pretty well in the record that if a person made erasure, if you knew about it, you would discipline him, if he deliberately did it?

A. If I knew he deliberately made an erasure to cover something up that was wrong, I would not have him in my department.

(Testimony of Ernest Bradford Colton.)

Mr. LILLICK: Q. Just one more question about this, Mr. Colton. In all of your experience as chief engineer, have you ever before had engineer bell book records covering sheets from four engines during a watch where an interval of time at the outside, of 8 minutes is concerned, that three of the sheets had erasures?

Miss PHILLIPS: Just a moment; all of the "Chicago's" bell sheets are here in court from the time she was commissioned, and I suggest if counsel wants an answer to that question he ask Mr. Colton to look over the bell sheets. They are right here. He does not have to answer from memory.

Mr. LILLICK: I want an answer to that question.

The COURT: Purely from memory?

Mr. LILLICK: Purely from memory.

A. Purely from memory, I would say we never had a condition surrounding an emergency such as this, and therefore I could not compare it to any other case.

Mr. LILLICK: Q. Were you on the "Chicago" on July 11, 1933?

A. Yes.

Q. You remember going out of San Francisco harbor that day in a heavy fog?

A. I don't recall the date. I have been on the ship every time she was under way.

Mr. LILLICK: May we have the record of July 11th?

(Testimony of Ernest Bradford Colton.)

The COURT: Is that the only time you had an emergency full [436] astern?

A. No, that is not the only time, that is why I want to get the date.

Mr. LILLICK: Q. While we are getting these bell records, do you remember the occasion, if I remind you that on the "Chicago" on that day you very nearly had a collision with a tanker called the "Paul Shoup"?

Miss PHILLIPS: This is not cross examination.

Mr. LILLICK: It would not have been had not the witness replied to my question that the bell sheets, that he never had another case like this before, and it happens that this was exactly the same.

Miss PHILLIPS: I do not think there was. I have heard about that. I will withdraw my objection.

A. You were mentioning some merchant ship, I don't recall the name.

Mr. LILLICK: Q. "Paul Shoup"?

A. No.

Q. You don't recall the occasion?

A. I don't recall the occasion.

Mr. LILLICK: I am in error as to the date, it was July 20, 1933.

Q. I hand you the engineer's bell book record for engines 1, 2, 3, and 4, and will ask you to look at the entries from 0737 to 0755, and tell me whether

(Testimony of Ernest Bradford Colton.)

that was not almost an exactly similar situation that confronted you with the "Silver Palm" insofar as your bell sheets are concerned?

A. I have looked at them before and seen no emergency full speed astern during that time. May I distinguish between emergency full speed astern and full speed astern?

Q. My own record indicates that your log shows emergency full, sounded siren and collision quarters. I think it should be 0746.

A. This shows full speed astern at 0746. It also shows the same thing on No. 1 engine full speed astern, 0746. Also the same on No. 2 engine, also the same on No. 3 engine, no emergency full speed astern shown on that date.

Q. I show you the deck log book for the "Chicago" for July 20, [437] 1933 and ask you to read the entry there.

A. May I finish that other answer? I see two erasures on No. 3 engine room at that time.

Q. What time?

A. 7:45 to 7:49. Do you want to see this, your Honor? It is very much the same.

Mr. LILLICK: Do not answer this question until Miss Phillips has an opportunity to object. I show you the deck log for the "Chicago" for July 20, 1933, and the entry 0746, and will ask you to read that entry from 0746 to 0747.

Miss PHILLIPS: I want to make an objection here, that it is not proper cross examination, for

(Testimony of Ernest Bradford Colton.)

several reasons, first the witness has been examined previously upon the bell sheets of his own department. Counsel is now taking the records from another department and examining the witness upon them. That record is not shown to be either in the possession, custody or control of this witness, he is not shown to have had anything to do with that, and furthermore the witness, who made the record he is now showing him, is not available in court to be questioned. I think the examination now is proceeding beyond all lawful bounds of cross examination, and I make that objection.

Mr. LILLICK: May I be heard. Your Honor will remember that in testifying to the erasures upon the bell sheet for October 24 was being examined about the erasures. My next question was whether he had ever, on a similar occasion, known of such erasures, and he said he had never known of a similar situation. I now propose to contradict that statement by showing the witness records of his own ship on another occasion and ask him whether, having his recollection refreshed by this he still wishes to stand by his other statement. I am not offering it for the purpose of bringing into the record what happened on the other occasion at all.

Miss PHILLIPS: My answer to that is, the witness has answered [438] the question that he has found full astern orders in the record shown him and has found such erasures, so he has answered the question that counsel has put to him.

(Testimony of Ernest Bradford Colton.)

Mr. LILLICK: Q. What is a similar occasion, Mr. Colton, after having refreshed your recollection from the record?

A. I know in general that on that particular day, from hearsay evidence, which I understand is not admissible, that we came close to another ship, but I did not see the other ship and I did not see any entries. Any entries that she had on emergency full speed astern.

The COURT: You recall no orders to that effect?

A. No, I recall no orders to that effect. The officer of the deck may have confused full speed astern and emergency full speed astern, as it is often confused.

Mr. LILLICK: Q. Where were the erasures to which you referred a few moments ago?

A. I said they appeared like erasures. Here is either an erasure or a scratch over. There are three "i's" or two "i's". This is either an erasure or a scratch over it.

Q. That is on bell sheet of engine No. 3. Can you tell me who the man was on watch?

A. No, it only shows the officer in charge of the watch.

Q. After the other entries at the time we have spoken of, 0736 to 0744—

A. (Interrupting) Here is another one. There are a number of them there.

(Testimony of Ernest Bradford Colton.)

Q. But you are pointing to other times than 0736 to 0744.

A. I believe you said a six minute interval here, from 746 to 751 is five minutes. There are several scratch overs.

Q. I was saying from 0736 to 0744.

Miss PHILLIPS: He has indicated there are erasures.

A. Yes. I would say they do not keep as good a record when under [439] a terrific strain as that.

Q. Your explanation, then, of these bell records is that they can not be relied upon?

A. As far as the counter reading goes.

Q. Would you say that the Navy pays attention to erasures?

Miss PHILLIPS: I am going to object to that. Counsel is apparently going to go over all of what he covered this morning about the matter of erasures, and that is not proper recross examination.

Mr. LILLICK: I stand on my rights. I made this note when Miss Phillips was asking the witness questions on redirect examination, and I only have a question that was suggested to me by that.

The COURT: I will hear the question, but it seems to me it has been pretty well covered.

Mr. LILLICK: Q. Do you never pay any attention to erasures?

A. I pay close attention to erasures. I would call a man up and ask him why an erasure was made

(Testimony of Ernest Bradford Colton.)

and if he said he made it by mistake and tried to correct it, that is a sufficient explanation for me.

Q. You made no inquiry relative to the erasures on this day, October 24, 1933?

A. I had no opportunity to make any.

The COURT: He said the records were taken from him before he had a chance to, did you not?

A. Yes.

The COURT: He testified to that before.

Mr. LILLICK: Q. Mr. Colton, is this your signature?

A. That is my signature.

Q. And that covers the entries from what date?

A. From midnight on the 23rd to midnight on the 24th.

Q. At the top of the page 759 to the bottom of the page—

A. It covers this.

Q. From the top of page 759 to 761?

A. Yes, it covers the 24-hour period starting from midnight to midnight. [440]

Mr. LILLICK: We offer these three pages in evidence.

Miss PHILLIPS: That is objected to as immaterial, irrelevant and incompetent, unless counsel shows some parts he wants to offer, it has no relevancy to the issues in this case.

Mr. LILLICK: The relevancy is with respect to the hydrocon tests on the boilers and the boiler

(Testimony of Ernest Bradford Colton.)

pressure that the "Chicago" had when steaming at 12 knots, and thereafter entering under standard speed, 18 knots, indicating the lowering of the boiler pressure, or increase of steam.

Q. I understand, Mr. Colton, that is a record of the pressures, is it not?

A. That is a record of the performance for those 24 hours.

Mr. LILLICK: I think we are entitled to it.

Miss PHILLIPS: I do not make an objection, but I think this will not be of any help to the court unless the witness is asked to explain something about these boiler records.

Mr. LILLICK: I think we have a right to have it in.

The COURT: It will be received as Respondent's Exhibit No. 8.

(The document was marked "Respondent's Exhibit No. 8")

Miss PHILLIPS: I want to make the point it is not proper recross examination.

Mr. LILLICK: The question was gone into.

Miss PHILLIPS: This morning, your Honor, not on redirect examination.

The COURT: I presume that that is correct and the objection is good, but I presume if counsel requests that the examination be reopened I would have to allow it.

Mr. LILLICK: It will only take a minute or two.

(Testimony of Ernest Bradford Colton.)

Q. At no time while the hydrocon tests were being made did the "Chicago" run at a speed of less than 18 knots an hour?

A. Yes.

Q. At 12 knots an hour?

A. Not 12 knots; I don't recall all of the speeds for that particular day, but it would be right in the log [441] there.

Q. It would be on this sheet that I hold in my hand?

A. Yes.

Q. Do you remember when they commenced with the tests on the hydrocon?

A. I do not recall the exact hour.

Q. Can you tell from this log?

A. I believe so, on the afternoon of the 23rd at 4 o'clock.

Q. At what speed were you running then?

A. Twelve knots.

Q. For how long did you continue to make twelve knots?

A. I will have to have the bell sheets for that.

Q. Which do you wish?

A. Any one of them I think will give it. I do not see any change in speed for the rest of that day.

Q. Then you continued to run at twelve knots an hour until approximately 7:26 on the following morning, October 24?

A. I believe that is correct.

(Testimony of Ernest Bradford Colton.)

Q. And the hydrecon test was continued under the twelve knot speed up to 18?

A. It was continued right on through.

Q. Was it necessary to run 18 knots an hour to test out that hydrecon?

A. It would be desirable, the higher the speed the quicker we would complete the test.

Mr. LILLICK: We have offered these two sheets in evidence.

Miss PHILLIPS: I suggest that they be removed from the book so that the rest of it can go back.

The COURT: You have already offered it as No. 8. Those sheets may be marked.

Miss PHILLIPS: At this time I would like to read into the record from page 152 of the deposition of Bernard Thomas Cox, master of the "Silver Palm" taken on Monday, November 6th, 1933:

"Miss PHILLIPS: Q. Captain Cox, I think you said that your vessel had seven or eight thousand tons of cargo on that morning?

A. About seven thousand—six to seven thousand, I said. [442]

"Q. I don't remember what it was, I just had a general figure in mind. How much had she still to go to be filled up?

"A. Another two thousand tons.

"Q. About 8500 is her capacity?

A. Nine thousand and five hundred I think—it is a little over 9000 anyway.

“Q. What is her gross tonnage?

A. 6373.”

BALDWIN M. WOODS,

called for the United States, sworn:

Miss PHILLIPS: Q. Will you please give your full name?

A. Baldwin M. Woods.

Q. What is your occupation?

A. I am a professor of mechanical engineering.

Q. Where is your present position?

A. I am a professor of mechanical engineering and chairman of the Department of Mechanical Engineering at the University of California.

Q. Will you please state what university training you have had, what degrees you have, and what places you have studied?

A. I received a degree of electrical engineering from the University of Texas in 1908. I later studied electrical engineering, mathematical physics and mathematics and mechanics at the University of California, receiving a degree of Master of Science in 1909, and Doctor of Philosophy in 1912. In the 1912-13 I studied at the University of Paris and the University of Munich in the general field of mathematical physics and mechanics.

(Testimony of Baldwin M. Woods.)

Q. Have you taught courses in the field of engineering mechanics at the University of California?

A. Yes, I have taught at the University of California since 1910. Since 1915 I have taught in the field of engineering and have credit courses in analytical mechanics, in the dynamics of machinery, and in aero dynamics and hydro dynamics, that is to [443] say, the science of motion of water and other fluids in hydraulics and in dynamics of fluids.

Q. Is there any special field that you have been engaged in, in doing special work?

A. My field of special interest is of fluid mechanics, that is to say, the motion of bodies through fluids, aeroplanes, etc.

Q. Are you an author of any book on dynamics or articles?

A. With my colleague, Prof. Younger I have written a book on the dynamics of aeroplanes and I have myself conducted investigations in the field of air dynamics, and published a number of scientific articles, some on aeroplane propellers, for example.

Q. What scientific associations are you a member of?

A. I am a member of the American Society of Mechanical Engineers and of the executive committee of the San Francisco section, I am a member of the Institute of the Aeronautical Science, I am a member of the Sigma Psi and a fellow of the American Association for the Advancement of Sciences.

(Testimony of Baldwin M. Woods.)

Q. Professor Woods, do you know whether in planning the construction of ships, tests on models of ships are of value?

A. Yes, they are.

Q. Are such tests common?

A. Yes, they are now common and are becoming more so.

Q. Have the methods and scientific laws for conducting tests of ship models been established, in your opinion?

A. Yes, they have been.

Q. Of what value do you consider such tests?

A. Tests of ship models, for example, are of extreme value in projecting not merely the qualitative performance of ships but also quantitative. For example, tests conducted on models for the new ocean liners, the "Bremen" and "Europa" resulted in a saving of about 5000 horse power at full speed. Tests on aeroplanes are made today before [444] any substantial change in design is undertaken. Tests in wind tunnels. In the case of ships, no serious modification of laws formerly considered desirable would be made by any large company without model tests.

Q. Do you know how to conduct a model test?

A. Yes.

Q. What has been your experience in that line?

A. I have conducted numerous model tests on aeroplane propellers, and also on aeroplanes them-

(Testimony of Baldwin M. Woods.)

selves, wings, bodies, some on ship models; for the last four years we have been planning a ship model laboratory for the University and have conducted extensive studies and made general plans for the realization of such laboratory.

Q. Have you studied, or have you had an opportunity to study, and of the extensive or important ship model testing plants?

A. I have visited and studied two of the prominent ones, the one at Washington Naval yard proposed and I think designed by Admiral Taylor shortly after 1900 and still in existence; until recently it was the largest and best of the American ship testing plants, I have also visited and studied the one at Hamburg, Germany, which is the best in Europe, or largest; I know the man who designed it and I have discussed its characteristics with him.

Q. Have you made any model tests which bear upon or relate to the U. S. S. "Chicago" and motor ship "Silver Palm"?

A. Yes.

Q. Now, professor, I would like to have you explain how you made the model tests. Let us begin first with, Where did you make them?

A. I made them in a swimming pool on the campus at the entrance to the University on March 11th.

Q. Where is that pool located?

A. The pool is located in Strawberry Canyon. It is not now used as a swimming pool.

(Testimony of Baldwin M. Woods.)

Q. Can you state whether or not this pool was a proper place to make the model tests?

A. It was an excellent place. The disturbing conditions there were at a minimum. There was no breeze, [445] for example, to disturb the surface of the water unduly, so as to cause any errors in the test. The size of the pool was such as to avoid difficulties from boundary effects. The depth was adequate to avoid any difficulty with depth effect.

Q. What day did you make these tests?

A. On March 11.

Q. Did anybody assist you in making the tests?

A. My colleague assistant professor, Vogt.

Q. Now I would like you to go ahead and explain the method of making such test. I think you should tell something about the size of the models used, the scale they are, and the like.

A. As was indicated a few minutes ago, there are definite laws governing the making of model tests if the tests are to be valid. I have prepared a few sketches showing the relative positions of the vessels which were used, the models which were used to represent the vessels, and the result of those tests.

Q. Might I ask you what were the relative or comparative weights which you took for the two ships?

A. The weights of the two ships were taken approximately in the ratio of 13 to 12. What was actually achieved—

(Testimony of Baldwin M. Woods.)

Q. Just a minute; which ship did you take as weighing 13 and which ship did you take as weighing 12?

A. If I may call the models by the names of "Silver Palm" and "Chicago", the "Silver Palm" was taken to weigh 13; it actually weighed 9.8 pounds. The "Chicago" was taken as 12; it actually weighed 8.9 pounds. It will be seen that that ratio is not exact, but it is approximate.

Q. What did you take as the length of the two vessels?

A. We used two vessels, which are models of characteristic vessel form, having a length 40 inches for the "Silver Palm" and 49 inches for the "Chicago". This gives an approximately model ratio of 1 to 150; for example, if the "Chicago" is considered to have a length of 600 feet, the model is approximately 4 feet, the [446] ratio of the length is one to 150.

Q. Will you go ahead and describe the tests that you made?

A. In order to have the tests valid, it is necessary that the speed used shall be taken in the ratio of the square root of the model scale ratio. For example, if the "Silver Palm" were assumed to have a velocity of 12 knots, then the velocity for the model at 150, should bear the ratio of that divided by the square root of 150 times 12, which is almost exactly one knot. One knot is approximately 1.7 feet per

(Testimony of Baldwin M. Woods.)

second. You will recall that the common expression is not miles per hour, the technical phrase is knots, which means nautical miles per hour. One knot is therefore 1.7 feet per second. The tests were conducted in three cases. I have here the sketch showing the mode of impact.

Q. What angle did you take for the mode of impact. Will you explain that to the court and explain the diagram?

A. In this case the "Chicago" was taken approximately at rest. The "Silver Palm" is going toward it at a velocity representing 12 knots, in feet it is between one and a half feet per second. The angle between the mean lines of the ships is taken at 40 degrees. In conducting tests of this sort it is necessary to make a number of trials to obtain the impact at a given position with a given velocity, because, at the time of impact, of course, no force must be exerted on either ship, they must be moving freely, therefore you will have a number of misses for one hit. I mentioned that because I do not wish to imply that there were just one or two tests. We eliminated a large number that were not valid. In the first case the "Chicago" was considered at rest. The "Silver Palm" was brought in at a speed corresponding to 12 knots, that is to say a speed of between $1\frac{1}{2}$ and 2 feet per second, or one and three-quarters feet per second. In this case after the [447] impact the positions were as shown in this

(Testimony of Baldwin M. Woods.)

diagram. I think it is desirable to have the two because we see what happens. The ship labeled "C" at the bow was turned to the right, the star-board, through an angle of some 50 degrees, perhaps, I should estimate that, and the one labeled the "Silver Palm" was turned to port through a larger angle, an angle of 80 or 90 degrees. This result was obtained with slight variation in the speed of the "Chicago" from the speed amounting to, or equivalent to one knot aft, to about one knot forward. I should say in a laboratory model it would be possible to equip both vessels with electrical motors and drive the propellers if we wanted the quantitative result. We did not do that. In case this vessel, for example the "Chicago" had propellers which were going astern at the time of the impact, it would, immediately thereafter be pulled toward the sternway, of course, and the bow of it would not rest so far forward, it might swing back here.

Miss PHILLIPS: I would like to have these two sketches marked as our exhibits next in order. The first in order is the one showing the angle of impact, and the next one showing the angle to which the two ships swung.

The COURT: They will be received and marked United States Exhibits 9-A and 9-B.

(Marked "United States Exhibits 9-A and 9-B".)

Miss PHILLIPS: Professor Woods, is it possi-

(Testimony of Baldwin M. Woods.)

ble for the bow representing the "Silver Palm", which is marked "S" here, to dig into the "Chicago's" side in that test?

A. The velocities were not sufficient for that in this case: I might say that in this position of impact, a little inclination of motion along the side of the "Chicago" was exhibited. There seemed to be—the impact was so nearly direct that there was little inclination of the prow of the ship to slide either way. [448] The vessels pulled around into that position.

Q. Into the position shown by 9-B?

A. Yes.

Q. Suppose you were to assume that the angle of impact was not quite 40 degrees, but there was a variation from it, either more than 40 or under 40, would there be any difference or was there any difference in the result of the swing of the two ships following the impact?

A. For a variation of as much as five or six degrees either way from the angle of 40 degrees we could detect no difference in the results. In a number of cases of course we did not come precisely at 40 degrees and therefore had a chance to observe.

Q. Now, did you conduct the tests in which the speed of the "Chicago" was taken at a figure other than the one you have just mentioned? As I understand, the last one was where the "Chicago" was at rest. Did you take any other speeds of the "Chicago"?

(Testimony of Baldwin M. Woods.)

A. Yes, we took speed very slowly astern and very slowly ahead, amounting to say one knot, one knot astern to one knot ahead.

Q. What results did you get on the swing of the two ships following the impact?

A. There was no essential change.

Q. The swing, as exhibited in 9-B would follow a blow as shown by 9-A if the "Silver Palm" was taken as going at 12 knots?

A. Yes.

Q. Do I understand you correctly?

A. Yes.

Q. If I misstate something I wish you would correct me as we go along, because I am out of my depth. Did you conduct any other tests?

A. We conducted a second series of tests in which the "Chicago" was given a forward velocity representing six knots, and the result of that impact is exhibited in this figure. The bows of the two ships are almost at 180 degrees; the tendency to side-swipe is very marked. The side-swiping of course occurred in this case since there was no cutting in, I mean no penetration of the side of the ship by the bow of the "Silver Palm". [449]

Q. In this second series of tests as exhibited, what was the angle of impact that you gave for the two ships, to hit at?

A. This is the last one.

Q. May I have the 9-A?

(Testimony of Baldwin M. Woods.)

A. The angle of impact in either case was the same. This was repeated, and of course with the "Chicago" in motion it became necessary to have even more trials to get the impact, but in every case where the "Chicago" had its forward equivalent roughly to six knots, the results were indicated on this diagram. It will be noted that the "Chicago" is deflected slightly from its path, but very slightly. I have drawn in here two lines. This line shows the direction that the ship came at before impact, and the lines drawn through the bow shows the position after the impact.

Miss PHILLIPS: May I have this last exhibit marked next in order, that being the last exhibit to which the witness has referred?

The COURT: It will be received as United States Exhibit 10.

(The diagram showing "Chicago" six knots ahead and the "Silver Palm" 12 knots ahead was marked U. S. Exhibit 10.)

Miss PHILLIPS: In other words, in conducting these two tests, I referred to the fact that the "Chicago" could not be taken in your tests as being gouged into. It would not be possible for you to show on the two models, or is it possible to show the effect of a helm, whether the helm was being used on either ship?

A. For the case in which the "Chicago" was at rest, it would make no difference, since the helm is

(Testimony of Baldwin M. Woods.)

inoperative until the ship has way on it, or since the propellers themselves are not operating. In the other case, the helm was not used, was not simulated in the test.

Q. Does that make any difference in the conclusion you would reach upon the model test?

A. No, it does not. The result of the [450] model test is the result of impact, and the impact is the same. The effect of the helm would be that of directing a vessel before or after, but the impact would be essentially unmodified.

Q. Did you make any other series of tests exhibiting any other speeds of the "Chicago" other than you have described?

A. I made a third series in which the "Chicago" was given motion astern simulating four knots. Again the impact was secured, the "Chicago" going astern about $7/10$ of a foot per second which amounts to four knots, and the "Silver Palm" was allowed to coast into it at the angle and in the position shown.

Q. That is the same angle of 40 degrees?

A. The same as before, in the preceding exhibit?

Q. What result did you get then, if the "Chicago" was taken as going astern four knots?

A. A very peculiar result. The two vessels remained in the same relative positions, but both turned 90 degrees. The "Chicago" which was going in this direction is now turned completely through

(Testimony of Baldwin M. Woods.)

90 degrees, and the "Silver Palm" follows it around—the two ships turn about a common center, about 90 degrees and that is the result.

Miss PHILLIPS: I would like to have this last sketch showing the result of an impact with the "Chicago" going astern at four knots, marked as our exhibit next in order.

The COURT: It will be marked U. S. Exhibit 11 in evidence.

(The sketch was marked "U. S. Exhibit 11".)

Miss PHILLIPS: Q. Professor Woods, have you seen and examined the photographs I am now handing you, or photographs similar to the ones I am now handing you. Please examine them.

A. Yes, I have seen a number of these.

Q. I observe that you are looking first at the pictures of the "Silver Palm" which were offered in evidence as Government's [451] Exhibit 3. Have you seen these pictures?

A. Yes, I have.

Q. And the pictures of the "Chicago" or similar pictures, have you seen them?

A. I have seen either these or similar pictures; I recognize some of them.

Q. I would like to point out to you that the witness who took these pictures of the "Silver Palm" testified that they were taken after arrival in port, while she was at the dock prior to the making of repairs, and that the group of pictures of the

(Testimony of Baldwin M. Woods.)

“Chicago” which you examined were testified to by the witness taking the pictures, as taken upon arrival at Mare Island, immediately, even before she got into dry dock, while she was in dry dock and prior to the undertaking of any repairs. Now do these pictures tell you anything about the relative speed of the two vessels?

A. Yes. I should like to speak first on the “Silver Palm”.

Q. Go right ahead and follow any order you want.

A. From the result of the model tests it would appear from the damage done to the “Silver Palm” and the line of the final position taken by what may be termed the forward seam—

Q. (Interrupting) Will you point out to the court the seam?

A. The forward seam is in this position. The final position of the forward seam would indicate that the impact was almost directly in a line of the longitudinal axis of the ship, in other words that the bow was folded back into the ship directly, and that is a condition which could happen, according to our tests, only if the “Chicago” was approximately at rest.

The COURT: How fast do you assume that the speed of the “Silver Palm” was?

A. I assumed, I took a speed simulating 12 knots.

Q. Twelve knots?

(Testimony of Baldwin M. Woods.)

A. Yes. I might say that in conducting experiments there was no means of maintaining that speed exactly the same. There might have been a variation of from as low as [452] ten to as high as 13 knots, I would judge; we actually found no change in the result to to such variation; in a large number of trials that were conducted, I suppose we must have had—I am afraid to estimate—forty or fifty collisions. In the next place I should remark that had the conditions simulated in Test 2, obtained, that is to say where the “Chicago” had considerable forward velocity, estimated at 6 knots, the side-swiping effect would have tended to bend the bow of this ship to port.

Miss PHILLIPS: You mean the “Silver Palm”?

A. The “Silver Palm” to port. In fact it is quite evident, depending upon the strength of the blow and the strength of the resisting plates, one of two results would have happened; this would have been folded, I mean the prow of the “Silver Palm” would have been folded or sheared to port, possibly sheared off entirely. The force of the side-swiping was so marked in the model, that the fact there was no penetration did not influence us, notwithstanding it made it easier to observe the distance of these tangential forces.

Q. That is, when you gave the “Chicago” a speed of six knots?

A. The side-swiping tendency is marked enough to obtain that result.

(Testimony of Baldwin M. Woods.)

Q. Suppose you gave the "Chicago" a speed in excess of six knots?

A. All tests of that sort indicated even greater side-swiping.

Q. Will you proceed with your comments on these pictures?

A. The impression one gains particularly about the cut in the "Chicago" is of course that the left hand side of the cut represents a clean shear of the plate. If one considers the direction of the impact as described, it is apparent that this side of the rammed portion would be thrown in tension and that after the bow penetrated, even if the "Chicago" were at rest, and the line as indicated, there would be an increased tendency on the after side [453] to fold back the plates; that is fully indicated in the pictures where the plates on the after side are pulled back.

Q. You are now pointing to Government's Exhibit 2F as illustrating what you have just referred to?

A. Yes. Those were the major conclusions that I drew from examining the pictures.

Q. Did you reach any conclusion from these pictures as to the speed of the "Chicago" at the time of impact?

A. I should draw the conclusion that the speed of the "Chicago" at the time of impact was within a range of one knot astern to one knot ahead.

(Testimony of Baldwin M. Woods.)

Q. If it be assumed that the speed of the "Chicago" were in excess of one knot ahead, taking any assumed speed you choose, could you tell us what difference in the physical result of the blow you would expect to find?

A. I am now examining this picture 2-F. Had the speed of the "Chicago" been forward in excess of one, or at most two knots, evidence of side-swiping would begin to be present; in other words the clean V which is exhibited here would become a wider gouge or else the prow of the "Silver Palm" would have been sheared off.

Q. Professor Woods, we have referred now to a speed of the "Silver Palm"; giving her a weight of approximately 13,000 tons, have you considered what the pounds of kinetic energy would be of such a blow as that?

A. Yes, I have considered the kinetic energy of a vessel of 13,000 long tons weight and have drawn a diagram to show the variation of that kinetic energy with the speed. This diagram starts with a kinetic energy at 14 knots, and diminishes to zero speed. The upper curve represents the kinetic energy of the "Silver Palm", the lower that of the "Chicago", although each must be taken as its own speed. If the "Silver Palm" had a speed of twelve knots, this kinetic energy was roughly 187,000,000 feet pounds at the time. The kinetic energy of the "Chicago" at any speed can be similarly taken from the curve. [454]

(Testimony of Baldwin M. Woods.)

Q. Can you tell us the formula you used, or is that too complicated? What is the formula you used?

A. The formula to get the kinetic energy poundage for any body having a straight line motion forward, regardless of the size used, is one half the mass of the body, which is its weight, divided by the acceleration due to gravity, times the speed of the vessel in feet per second.

Q. Professor Woods, I have another question I would like to ask you? What is meant by the term "relative motion"?

A. Motion as we recognize it normally, is recognized as always relative. Ordinarily, if we think of motion, the earth is considered to be at rest. If you are talking of the solar system you frequently think of the sun as at rest. Always there must be a plane we say in physics which is considered at rest. Now it makes a great deal of difference in your impression of the motion according to the body or bodies which you consider to be at rest. If, for example, you are on a vessel at sea, most of your impressions are based upon the assumption that the vessel is at rest. If you are swimming in the ocean your impression would be based upon the assumption that the ocean is at rest. Your motion is relative to it. When you combine the impressions under one condition to those under another you get different problems of relative motion.

(Testimony of Baldwin M. Woods.)

Q. What is the effect of wind in forming an opinion upon relative motion when the ship is at sea?

A. It is an common expression of mariners that the effect of the wind vitiates judgment as to velocity, since the waves and white caps formed are determined in large degree by the wind. On this account if one regards the waves as at rest when they are not, and judges the speed of a vessel relative to the waves, he will get false results.

Q. I wish you would consider the case of a ship, let us assume [455] that it is slowly backing, and that it is struck on the port bow by a vessel going straight ahead at an angle of approximately 40 degrees—what visual impression would be obtained by anyone on the ship that was struck?

A. Under the assumed conditions, if the witness is assumed to be on a line of the incoming ship—if I may refer to this—if the witness is on this portion of the ship and this vessel is coming straight on and this one is backing slowly, then the motion astern of this ship gradually exposes more of the starboard of this vessel to his view, more of the side of the oncoming ship, say the “Silver Palm”. That is the same impression that you would have were this vessel at rest and the “Silver Palm” turning to port. If, therefore, he conceived this vessel at rest he would assume that the “Silver Palm” was moving to port, when in fact she was coming straight ahead.

(Testimony of Baldwin M. Woods.)

Q. If, in fact, the vessel that is struck is moving astern and the oncoming vessel is pursuing a straight course, what would be the visual impression of the witness on the ship that is struck?

A. The impression of the witness on the ship that is struck, if his vessel is moving astern and the other is coming straight ahead, is that the vessel coming toward him is turning to port.

Q. Professor Woods, going back to the model tests that you conducted, in conducting these tests did you follow the laws for conducting of model tests to the best of your knowledge and ability?

A. Yes, we did.

Miss PHILLIPS: You may cross examine.

Cross Examination.

Mr. LILLICK: Q. In the last diagram that you used in connection with showing what the impression of an observer would be upon the "Chicago", would he not have had the same impression as that you [456] have described had the "Chicago" been bodily coming over to the left?

A. At right angles to the water?

Q. At right angles through the water or in a motion ahead, but slipping off sideways, we will say, as much as 50 yards?

A. Had the motion of the vessel which was struck been such as to expose an increasing portion, an increasing view of the starboard side of the "Silver Palm" the impression would have been conveyed to

(Testimony of Baldwin M. Woods.)

the observer that the "Silver Palm" was turning to port.

Q. In other words, exactly the same impression that you have a moment or two ago, said that the observer would have had if in fact, the "Chicago" had been going astern?

A. Depending upon the magnitude, yes.

Q. But the same general impression would have been given to him?

A. Yes.

Q. In the experiment that you conducted, professor, models were solid models, were they, solid pieces of wood?

A. They were in part yes, and in part no; that is to say they were made of laminations, laminated wood in order to maintain their shape under repeated tests.

Q. In other words, they were solid wood, and if I understand, laminated means one layer upon the other?

A. Yes.

Q. So that they would withstand the impact?

A. Well, they would withstand not merely the impact, but deterioration of time, and would not change shape too greatly.

Q. In continuous tests that you were making over a longer period of time?

A. It really has no reference to the tests.

(Testimony of Baldwin M. Woods.)

Q. In your experiments did you pay any attention whatever to the maneuverability of the vessels as to being able to turn to the right or to the left?

A. No.

Q. There was no account taken, in the experiment, of a possible deflecting momentum because of the "Silver Palm" turning to the [457] right?

A. I do not understand the term "deflecting momentum."

Q. I am going beyond my depth, professor, so I shall be glad to have you ask me if my question is not clear. I will rephrase the question. If a model such as that you conducted this experiment with had been equipped with a rudder for an appreciable period, sufficient to change the course of the "Silver Palm" from straight ahead to a starboard course, would the "Silver Palm", in being, as I said, deflected from her course, have her speed at all affected?

Miss PHILLIPS: I object to that as unintelligible.

A. If I may take the diagram—

Mr. LILLICK: If the witness informs me that any of my questions are unintelligible I will try to make them clear.

Miss PHILLIPS: I will withdraw the objection.

A. If I may interpret the question, I assume what was meant is this, that, had the "Silver Palm"—First may I make a distinction—If the "Silver

(Testimony of Baldwin M. Woods.)

Palm" had been turned through an angle, but is not at a given instant through turning, then there is not possible change in the result. The question must relate to the instantaneous condition of the body in motion. If the "Silver Palm", at the moment of impact, were still turning to starboard, its angular momentum, or a portion of its angular energy is one of rotation.

Q. In other words, the momentum which would have been hers had she been going straight ahead, is to some extent deflected by it being taken up by the stern and shoved off sideways: Is that a correct statement?

A. I can not see it that way. The kinetic energy then consists of two parts, the swing of the ship considered as the center of gravity moving in the direction in which it is moved, plus the swing of rotation of the ship, considering it rotating about a center of gravity and the effect of this latter would be to increase the side-swiping effect. [458]

Q. But as to the straight momentum, would the "Silver Palm", had she been turning on a hard starboard helm, have had the impact itself lessened by turning to the right instead of going straight ahead?

A. It would be very difficult to say.

Q. All of these experiments that you performed, as I understand it, were performed with the "Silver Palm" coming straight toward the model of the "Chicago"?

A. Yes, approximately.

(Testimony of Baldwin M. Woods.)

Q. How did you conduct your experiments, with a string attached to the stem of the model of the "Silver Palm"?

A. Yes.

Q. And a string attached to the model of the "Chicago" at the stem?

A. Yes, it was necessary to supplement the string with rods, etc., to make the vessel behave as desired.

Q. What power did you use to pull them—how did you have your power rigged up so you had a definite speed of twelve knots an hour in the comparative way you measured it?

A. We practiced pulling the vessel until we could repeatedly check with a stop watch, that the distance measured along the side of the basin came within ten per cent of the speed which we desired.

Q. Did you walk, or did the person who was on the end of the string do the walking, or was the course over such a short space of water that he just pulled it with his hand?

A. It was not necessary to walk, since, when the vessel had been given an initial pull it would continue on its way gradually losing speed and arriving at approximately the speed desired.

Q. From what position at rest was the model of the "Silver Palm" started?

A. The "Silver Palm" was started from a position at rest in the direction in which it was desired to have it moved.

(Testimony of Baldwin M. Woods.)

Q. How far away from the model of the “Chicago” waiting for the impact?

A. From ten to twenty feet, various distances—I should estimate [459] about 15 feet—far enough to allow any initial turbulence in the water, or any other disturbance to be entirely out of the range of this experiment.

Q. Was that string kept taut from the moment the model started in the water?

A. No; immediately the vessel had acquired the necessary way the string was dropped.

Q. So that after it had acquired the necessary way over the 15 feet, you thereafter, over a series of forty experiments, you placed your velocity at the time of the impact at what your average result was, and judged the velocity of the impact from that?

Miss PHILLIPS: I think that question has several questions in it, your Honor.

Mr. LILLICK: I will try to reframe it. Q. Having started your model from 15 feet away, and after you had given it the initial impetus I understand, you thereafter permitted it to come up to the model of the “Chicago” without putting on any more pressure on the string: Is that right?

A. Yes.

Q. So that over your series of 40 experiments, this model in each instance, was started 15 feet away on a string, and you by mathematical calculation,

(Testimony of Baldwin M. Woods.)

determined than when it struck the model of the "Chicago" it was proceeding at the rate of speed that you considered as of one to 120, did you say?

A. No, the scale ratio is one to 150. The velocity ratio should be in the ratio of the square root, that is about one to the square root of 150, which is a bit more than 12.

Q. As I understand it, you started the model with an initial pull, withdrew that pull or pressure, and then, over a series of 40 experiments, computed that by comparing the pressure you used, when you did finally arrive at the diagram that you have used, the "Silver Palm" at the moment of her impact was going at the rate [460] of speed that was given you as 12 knots?

A. I might say that we repeated the experiment a number of times, in each case starting the "Silver Palm" as suggested with a string and each time we observed what happened, waiting until the two vessels had reached a position, until the two vessels were approximately at rest in the water.

Q. But what I am trying to ascertain, is how did you figure her speed of twelve knots at the moment of impact. How did you arrive at that momentum?

A. To obtain the energy at the moment of impact, it is not necessary to conduct any experiment at all. One can compute that from the normal laws of mechanics, but the computations for the

(Testimony of Baldwin M. Woods.)

energy were made without reference to the experiment.

Q. But in order to obtain the result on your diagram in relation to the position the vessel occupied after the impact, it was necessary for you, was it not, to so work out your problem that at the moment of impact the "Silver Palm" would be going at the velocity stated, 12 knots?

A. The "Silver Palm" was started at a velocity of 12 knots and allowed to coast after the initial start, gradually losing velocity, and it has been assumed, for the sake of simplicity, and which is a matter of observation, that the velocity at the time of impact was approximately that; undoubtedly it had dropped slightly.

Q. And yet at the commencement of the 15 feet, the initial pull was the 12 knot computation?

A. It was not a question of computation but of pulling, measured from the side, the velocity obtained, we could get the speed corresponding. That speed is roughly 1.7 feet per second.

Q. So that, as I understand it, on the edge of the pool you had a measure check-off in markers, did you, so that you could start the "Silver Palm" more than 15 feet away, or just 15 feet?

A. We practiced on one side of the pool getting the "Silver Palm" [461] to move roughly 1.7 feet, perhaps 2 feet per second, from 1.5 up to 2 feet, or approximately 2 feet per second, and having acquired that adjustment of the speed, we then pro-

(Testimony of Baldwin M. Woods.)

ceeded without measurement on the individual trials.

Q. At 15 feet away from the model of the "Chicago" you released the pressure so that thereafter she coasted up to the "Chicago"?

A. Yes, we found to our great interest that the variation of even 15 or 20 per cent in the speed made no difference in the result.

Q. How did you compute that result as what happened? You do not mean to tell me that it made a difference of 15 or 20 per cent pressure at the impact, did you?

A. We made no computation, we observed.

Q. Then you mean it made a difference of 20 per cent in relation to the movement of the bow of the "Chicago" after she struck. What is that 20 per cent taken of?

A. No, what I meant is this, that if the variation in the speed which we succeeded in giving the "Silver Palm" amounted to 15 or 20 per cent range, based on ten per cent above 12 knots, to 10 per cent below, the experiment when repeated several times gave no difference in the result.

Q. And that result was only to find out what happened to the vessel after they had struck, in relation to how they would finally end at rest. That was the object of the experiment was it?

A. It was one of the achieved results.

Q. That was one of the achieved results?

A. Yes.

(Testimony of Baldwin M. Woods.)

Q. You had, of course, in the pool a solid body of water, there were no waves?

A. Immaterial.

Q. You think it would be immaterial?

A. Yes. I mean to say that the surface of the water was so nearly calm that we would not have a wave effect to consider.

Q. Professor, I have been fortunate enough myself to have gone over to that pool and have seen an experiment, a test by a professor, and when I was there it is my recollection that those [462] making the tests were testing out the speed of a vessel by working out the coefficient of the stem. Can you explain that?

A. It happens that it is a little difficult to tell where to begin. It happens that the resistance to the motion of a vessel through the water is made up of two principal parts, the resistance of the water to the sub structure, we call it the portion under the ship; the surface resistance, which may be affected by the waves, and the resistance of the superstructure, which is affected by the wind. The resistance of the sub-structure is materially affected by the stream line of it, that is to say, the form of the hull, so that the fluid, in passing by is giving minimum disturbance. The two portions of the vessel which require most careful study in that case, are the

(Testimony of Baldwin M. Woods.)

proW and the hull. We are greatly indebted to Admiral Taylor for, in a measure discovering, or at least making the world well aware of the merits of what is known as the bulbous bow. The bulbous bow has been copied by many other nations and is used on the cruisers and battleships of our fleet. It is also used more recently on a number of the largest and fastest vessels afloat, particularly the "Bremen" and "Europa" as two famous examples. The proW coefficient, if one wishes to call it that, would be affected by the design of the bulbous bow. The hull coefficient would be affected so that it is very difficult to measure without the propellers in place, what would be affected by the streamline at the hull.

Q. Now in the experiment, did the model of the "Chicago" that you used, have a form such as you know that of the "Chicago" to be?

A. Sufficiently for the purposes of experiment.

Q. What do you mean by "sufficiently for the purposes of experiment"?

A. I mean simply to say that, to determine what would happen to two masses after impact, it is not necessary to have [463] the details in form the same, provided the general shape is the same.

Q. Would it make no difference if at the time of the impact, even in your models, assuming a speed of, I think you have given, as six knots—am I right, six knots for the "Chicago" in one experiment?

A. Yes.

(Testimony of Baldwin M. Woods.)

Q. If at that moment she was turning on a hard astarboard helm, with all of her engines backing at full power?

A. If I understand your question it is, Would the combined effect of the engines reversing, starboard rudder and variation form of the hull, make a difference in the impact?

Q. Yes.

The COURT: You are assuming that she is dead in the water?

Mr. LILLICK: No, I am assuming that she is proceeding at a rate of six knots through the water at the time of the impact, that she was then on a hard astarboard helm with all four propellers backing at full emergency power, the witness having given us the diagram of the result after the vessels came together.

The COURT: I was wondering about the speed you were talking about.

A. In the model test it is my judgment that the shape of the vessel would not be a contributing factor, the minor modifications in that case would not be a contributing factor to the result.

Q. So that it would not make any difference whether she were going ahead or astern?

A. As far as the shape is concerned.

Q. The speed is increased by the sharp prow and the bulbous streamline effect, isn't it?

(Testimony of Baldwin M. Woods.)

A. The streamline and the bulbous bow reduces the resistance very much and gives power to propel the vessel at greater speed.

Q. And gives her greater maneuverability also, does it not? In [464] other words, she would turn more quickly?

A. There is not necessarily a direct connection between the maneuverability and the bulbous bow.

Q. Let us put it this way, professor, if a 12,000 ton vessel is lying dead in the water motionless, would an impact from another vessel cause her to swing around in the same position at that impact, and with a 12,000 ton vessel operating under a six knot speed with a hard astarboard helm, and at that moment turning to starboard with all her engines reversing, would the results be the same?

A. The difference in forces I should have to compute to determine the percentage of effect of the propellers and the helm, under those conditions. The very great disparity in the forces would, however, lead me to judge, subject to minor alterations upon computation, that the effect of the blow is so incomparably greater than the effect of the other elements introduced, that the change from the conditions found, without rudder operating and propeller in reverse, would not be material.

Q. What do you mean by the "disparity"?

The COURT: How much longer do you think you will take?

(Testimony of Baldwin M. Woods.)

Mr. LILLICK: I will take at least 15 minutes.

Miss PHILLIPS: I have some more examination.

The COURT: I think we had better take an adjournment now until tomorrow morning at 10 o'clock.

(At this time an adjournment was taken until tomorrow, Thursday, March 22, at 10 o'clock a. m.)

Filed June 19, 1934. [465]

Thursday, March 22nd, 1934.

BALDWIN M. WOODS

Recalled

Cross Examination Resumed.

Mr. LILLICK: May it please the court, when the depositions were taken of the officers and crew of the "Silver Palm" we had with us all of the log books, rough and smooth and deck, including the bell books, which Miss Phillips agreed might be left at our office until they might be needed in court, and having been asked for this morning we have produced them to the district attorney.

Miss PHILLIPS: That is correct.

Mr. LILLICK: Q. Professor Woods, in conducting your experiments or your tests, did you attempt to have the model you used for the "Silver Palm" strike the "Chicago" and rebound and then strike the "Chicago" again?

(Testimony of Baldwin M. Woods.)

A. The direct answer is "No". I should need to qualify that, however, by saying that in one or two of the experiments it did, in effect, operate in that fashion.

Q. But you did not attempt to make the model of the "Silver Palm" strike the "Chicago", rebound and then strike again?

A. No. I should consider that quite unscientific.

Q. When you made the experiment on some of the tests where you tried to make the "Chicago" go at a relative speed of six knots, did any of the trials result in a seeming rebound and a second strike?

A. I don't remember.

Q. You are unable to say, then, whether the instances of which you have just spoken where that seemed to be true were in those instances where the "Chicago" was going at a relative speed of six knots?

A. I am unable to say, but I recall several cases in which it rebounded when the "Chicago" was at rest.

Q. You recall none when your model of the "Chicago" was in relative motion at six knots an hour?

A. I don't recall any.

Q. Did you perform any tests with the model of the "Chicago" proceeding at a relative rate of speed in excess of six knots?

A. Yes.

Q. At what rate of speed?

(Testimony of Baldwin M. Woods.)

A. Between six and ten. I should like to correct that, between six and twelve.

Q. Did the results in those instances where the model was moving at a relative rate of speed of six to twelve, agree with the results where the model was moving at from four to six?

A. Yes, with an accentuation of what I should call a side swiping. In every such case the vessels went by each other, in other words, immediately after the impact they went so that the prows were, after the impact, facing in opposite directions.

Q. And with your models there was, of course, no puncturing of the hull of the model of the "Chicago"?

A. No.

Q. In other words, there was no impinging upon the model of the "Chicago", cutting in with a forceful holding of the bow of the model of the "Silver Palm" in the model of the "Chicago"?

A. Unfortunately I put a different significance to the word "impinging". Would you mind restating it?

Q. I will reframe the question. I think "impinging" is not a proper word. In other words, your tests did not enable you to come to any conclusions with respect to what might have happened had the model of the "Silver Palm" used by you cut into the hull of the model of the "Chicago" so that the bow of the model of the "Silver Palm" would have been held in the gash in the model of the "Chicago"?

(Testimony of Baldwin M. Woods.)

A. Oh yes. I was led to quite a definite conclusion.

Q. Did your experiment enable you to do that?

A. The motion of the two models at impact was such as to indicate clearly the character of the forces existing; the character of those forces is what would determine what happened to the prow of the "Silver Palm" or the side of the "Chicago" in case there had been intrusion of the prow into the port side of the "Chicago". [467]

Q. Did I understand you that is your opinion based upon the tests you made, that had the "Chicago" been going at a rate of speed of 12 knots an hour the "Chicago" would have kept on going in the same general direction in which she was, and the "Silver Palm" sideswiped her and gone in an opposite direction?

A. Yes, that is my conclusion.

Q. That is, the bow of the "Silver Palm" would not have been caught in the gash made in the "Chicago"?

A. I do not mean to imply that it would not have made a gash or cut, but in my judgment that would not have been sufficient to hold it in that position.

Q. In other words, she would have struck and, as you put it, gone ahead, side-swiping the "Chicago"?

A. Yes.

(Testimony of Baldwin M. Woods.)

Q. In other words, somewhat the same relative positions indicated by United States Exhibit No. 10, with the bows of the respective vessels pointing in opposite directions?

A. Yes. With greater speed there would have been greater displacement.

Q. Then in none of your trials with these two wooden models, since there was no puncture of the model representing the "Chicago", you made no allowance for a holding of the model of the "Silver Palm" in the side of the "Chicago"?

A. I don't quite understand you.

Q. May I have the question repeated?

The COURT: Read the question.

(The last question was repeated by the reporter.)

A. I have made allowance in the interpretation of the experiment. No arrangements were made to have it puncture the other, no.

Mr. LILLICK: Q. Before you made your tests were you informed that the instant before the collision the engines of the "Silver Palm" were put full speed ahead?

A. No, I was not. May I have that question read again?

The COURT: Read the question. [468]

(The question was repeated by the reporter.)

A. That answer is correct.

Mr. LILLICK: Q. If, an instant before the collision, the engines of the "Silver Palm" had

(Testimony of Baldwin M. Woods.)

been put full speed ahead what effect would that have had in your opinion, with respect to keeping the model of the "Silver Palm" in the side of your model of the "Chicago", if your model of the "Chicago" had been puncturable, and your models had had engines?

A. You are still referring to the case with the "Chicago" moving forward at six knots?

Q. In any position, moving forward or still in the water.

A. It would depend upon the elapsed time of the starting of the engines of the "Silver Palm" and the completion of penetration of the two vessels. The propellers of the "Silver Palm", if the initial conditions be considered, is one of being nearly at rest: they were being turned—Let me with that "nearly at rest"—they were being turned by the fluid current which was driving the propellers and therefore the engines, instead of the reverse condition which exists when the engines are driven forward. The same thing happens when an aeroplane dives with an engine out, the propeller is rotated by the air. Located in the water, when a ship is coasting above a speed of five or six knots, depending on conditions, the propellers are turned by the fluid, and when power is suddenly given to a large engine of the character used on the "Silver Palm", the first impulses begin to relieve the propeller of the drive—Let me put it another way. The first impulse from the propellers up to the point

(Testimony of Baldwin M. Woods.)

where their speed results in no thrust—in the beginning they have negative thrust; then as they pass to a higher speed they take over the charge of pushing the vessel. This would require several seconds during the speeding up of the engines. The penetration, should the throttle be given to the engine so that [469] it would begin firing at the instant of the impact—it would depend upon the time of penetration as to whether any results were felt by the ship.

Q. Then would you say that with the propellers still turning over on the “Silver Palm” and engine power applied immediately, that it would take, let us say, two or three seconds for that power to be applied?

A. I dislike to guess. I could form an opinion after examining my notes, on the subject, which I have not here unfortunately. But my first estimate would be something of the order not greater than five seconds.

Q. What kind of an engine are you assuming from that?

A. I am assuming a modern Diesel engine on the “Silver Palm”.

Q. Would there be any difference between a Diesel engine in that respect, and a reciprocating engine?

A. A reciprocating steam engine?

Q. Yes.

A. Yes; in that the net over all effect there would be very little different, because the time of penetration, which I have not computed, but which I form

(Testimony of Baldwin M. Woods.)

a reasonable estimate of, if I were to compute it, is probably not much greater, if any, than the time required for either engine to come up to speed. Reciprocating steam engines are not involved on either ship, are they?

Q. No, they are not.

A. The reversing of reciprocating engines characterized by slow speed and large reciprocating masses is difficult to state.

Q. Which is quicker in operation, a reciprocating steam engine or Diesel engine?

A. That depends. If one is referring to maneuvering at speeds below the speed at which the outside current will turn over the propeller, then a modern Diesel engine without brakes is a very quick performer. Your Honor there are many types of drive in ships, and generalizing, we have electric drives which give very quick reversibility, we have indirect electrical drives, we have drives by turbines which are steam turbines, we have many types [470] of Diesel engines, four stroke cycle and two stroke cycle, and those drives may be combined also with electrical drives. I could go into a discussion one by one, if you wanted it.

Q. I would not care to have that. Professor Woods, let me read to you the testimony of Captain Kays, who was on the bridge of the "Chicago" at the time, and in charge of the vessel's maneuvers. I am reading from page 56: "The vessel, which I found out afterwards was the 'Silver Palm', recoiled as she struck, the 'Chicago' heeled heavily

(Testimony of Baldwin M. Woods.)

to starboard and I got the mental impression that she was swinging to the right. The 'Chicago', as she came back, rolled back to port, nearly touched the 'Silver Palm' again, and I think it was about the time it struck that I ordered one-third slow engine, and then I continued to back so that she would back away from her, and we pulled away a short distance and then stopped, the 'Silver Palm' lying then more or less parallel to us some distance away." Assuming for the purpose of this question that what I have just read accurately depicts what Captain Kays saw and what he did, at what time subsequent to the collision would you say that the two vessels were in the position you have assigned to them in your diagram, United States Exhibit 9-B?

A. I did not measure the distance in the case of the models, and without having done so I could not estimate the time for the case of the ships themselves.

Q. Did you take into consideration the fact that the "Chicago's" engines were ordered one-third slow as the "Silver Palm" touched the "Chicago" again, and that the engines of the "Chicago" continued to back until they had pulled away a short distance from her when you performed the tests?

A. I took into consideration in interpretation of the tests the pitch of the propellers, and discovered that neither for full speed astern nor any fraction, did they modify the result materially. I ran through the compu- [471] tation again last night and dis-

(Testimony of Baldwin M. Woods.)

covered the difference to be less than two per cent, which is smaller than the possible error of observation.

Q. Professor Woods, will you please listen to this question that I asked a moment ago, which I am now going to ask to be repeated and answer the question. May we have the question read, your Honor?

The COURT: Read the question.

(The question was repeated by the reporter.)

Mr. LILLICK: That question may be answered yes or no Professor Woods.

A. If I answer it "Yes" I shall have to qualify it.

Q. I am entitled to an answer "Yes" or "No" as I understand it, and then you can qualify it if you wish.

The COURT: You can qualify it. If you can answer it yes or no, and then if you wish to make an explanation you may.

A. Yes.

Q. Then you may give your explanation if you wish to.

A. When I answered it "yes" I did not mean to say that I made physical modifications of the vessel or the conditions of the test, but I analyzed the possible forces resulting from such actions and found them inconsiderable.

Mr. LILLICK: Q. Professor Woods, until I asked you that question two or three minutes ago, had you heard before that at the time of this col-

(Testimony of Baldwin M. Woods.)

lision when the "Silver Palm" struck the "Chicago" for the second time, the engines on the "Chicago" were ordered one-third slow and that the vessel continued to back so that she backed away from the "Silver Palm" and that the "Chicago" pulled a short distance away and then stopped. Did you ever hear of that until I asked you about that a few moments ago?

A. Not in all of the details which you gave, but in substance.

Q. Then when you made this diagram, U. S. Exhibit 9-B you took [472] into consideration the fact that after the "Silver Palm" had come into contact with the "Chicago" and had rebounded, or recoiled and struck her again, that as that second rebound occurred the engines of the "Chicago" were put one-third slow, when they had therefore been going full speed emergency reverse, and that the "Chicago" pulled away from the "Silver Palm" and stopped in a somewhat parallel position?

A. I would like to have that read.

The COURT: Read the question.

(The question was repeated by the reporter.)

Mr. LILLICK: Q. Did you take that into consideration in making this diagram?

A. No. I should like to explain in this particular, that the diagram represents the actual position of the models. The factors such as additional forces due to propeller and engines back on the vessel were given consideration separately. It is not scientific laboratory practice to modify results of experi-

(Testimony of Baldwin M. Woods.)

ments in reporting them in diagrams that are submitted. The diagram should be an exact picture of what happened, and any modifications should come in interpretation.

Q. I am not sure that I understand you, Mr. Woods. In making tests of the character that you made in order to draw that diagram, do I understand that to come to a sound conclusion from the result shown by the diagram, you did not have to have scientific foundation as the basis for that?

A. On the contrary. One has to be confident that the conditions of the test, the model test, simulates conditions which he is attempting to picture.

Q. You were attempting to picture what occurred at sea at the time of this collision?

A. Yes.

Q. Mr. Woods, we have had testimony that the "Silver Palm," after puncturing the side of the "Chicago" came right along with her until the "Chicago" had swung 50 degrees to the right. In any of the tests did you so arrange them that the model you used for [473] the "Silver Palm" remained in and on the port bow of the model of the "Chicago" until that model had turned 50 degrees to the right?

A. May I consult my notes a moment?

Q. You are referring to data, Mr. Woods, from which you were asked to make this diagram. I am asking for your memory, first, please.

A. My recollection is that the point of contact remained approximately constant during the swing-

(Testimony of Baldwin M. Woods.)

ing of at least 35 degrees of the "Chicago". Toward the last ten or fifteen degrees of swing, roughly, of the 50 degrees I would not say that in the model tests the contact was maintained.

Q. How long did you maintain the contact between the two vessels in any of your tests?

A. I am obliged to answer that, I did not maintain it; that is to say I let the forces between the two ships to their own actions.

Q. Without consideration of any forces that either one or the other vessel had, independent of initial velocity?

A. In the test itself as exhibited here, the forces which were acting were those of impact of vessels moving as described. In the interpretation of them I have taken into consideration other forces, and as I said before, have found them inconsiderable in comparison with those forces. For example, if the penetration occupied a distance of 20 feet, or covered, I should prefer to say, a distance of 20 feet, and if the "Silver Palm" was proceeding at 10 knots—

Q. (Interrupting) You are now reading from your notes?

A. I am reading a computation that I made. I refer again to the kinetic energy diagram which I had yesterday. I found the kinetic energy of the "Silver Palm" at 10 knots to be roughly 130 million pounds. If the vessel penetrates 20 feet, and if one considers that it has uniform deceleration curves—the deceleration [474] probably was not uniform,

(Testimony of Baldwin M. Woods.)

but that is close enough, then the actual magnitude of the blow delivered was six and one half million pounds. That is the average magnitude, it might have varied as it struck, in cutting, and probably did, it probably rose to a magnitude considerably higher, perhaps higher than ten million pounds, and ending at zero. At the same time if the propellers were given full reverse on this vessel with 27,000 horse power available, which I assume for the moment, it would exert a force of about 150,000 pounds astern, it will act in a line to the center of the vessel.

Q. You are assuming are you, that you at that moment were reversing with that power?

A. Yes, for reverse.

Q. Moving through the water with that power?

A. Moving through the water with full reverse, but moving forward.

Q. But moving forward?

A. About six knots. Then the force of the propellers would act right along the axis and would exert no influence to turn the vessel; combined with the rudder they would exert an influence which would accentuate the effect of the rudder but the force of 150,000 pounds compared with a force of six and a half million is as an error of 2 per cent, and consequently in a model test of this sort, where the other errors are likely to be as great as two per cent, there would be nothing gained in attempting to simulate them.

(Testimony of Baldwin M. Woods.)

Q. Now, Mr. Woods, I understand that this diagram, United States Exhibit 9-B was made by you with the assumption that the "Silver Palm" remained in contact with the "Chicago" over 35 degrees angle?

A. That was a result, not an assumption.

Q. What do you mean by result and not an assumption?

A. In an experiment one controls certain variables, and the laws of nature provide the result. In this experiment the position and relative velocities of the models were the controlled variables, [475] and the things which happened were the results.

Q. So that your testimony now is that the "Chicago" was moved to the right for 35 degrees, during which time the "Silver Palm" remained in constant contact with her, and forcing her around?

A. Approximately, yes.

Q. Will you tell me what the factors were which you had with which to perform these experiments, the data?

A. Well, I had a great many data.

Q. That is what I want.

A. To which do you refer?

Q. I refer to all of the information which you had from which you performed the experiment leading up to the diagram which I have referred to, United States Exhibit 9-B.

(Testimony of Baldwin M. Woods.)

A. To begin with, I had general data concerning model tests and laws of dynamic similitude which are involved which I have accumulated over a period of about 18 years. I had specific data concerning the length and displacement approximately, of each of the vessels.

Q. Will you let me have that, please? If you have it in writing I will be glad to have that.

A. I have not it here. I think I can recall the salient items from memory. The length of the "Chicago" is approximately 600 feet. Its displacement slightly over 12,000 tons. The length of the "Silver Palm" I do not recall exactly, but remember it about on the order of 450 feet. I will be glad to be corrected if that is not exactly right. The displacement of the "Silver Palm" aside from cargo was something over 6000 tons, I believe 6300. I will have to look at my notes.

Q. Will you look at your notes, if you have them? What I want is the data that you used in performing the experiment.

A. Here is my information concerning the "Chicago".

Q. Will you pardon me. Did it come to you in the form of a letter?

A. Yes.

Q. May I see it?

A. It came to me in the form of a letter [476] from the United States Attorney, the last paragraph.

(Testimony of Baldwin M. Woods.)

Miss PHILLIPS: Just a moment. Counsel has asked me a number of questions whether the witness had any instructions. I gave the witness such instructions as he had, and I would be very glad to state them, or state them under oath, but I do not want to be in the position of being deprived the right to argue the case. If I am a witness I can not argue the case. If counsel wants to have me take the stand I would be glad to, but I do not want to lose the chance of arguing this case.

Mr. LILLICK: I will waive any such rule that there may be on my part.

Miss PHILLIPS: Shall I state what I told the witness, or have him tell you?

Mr. LILLICK: I would much prefer to have the witness state.

Miss PHILLIPS: Here is a letter about the displacement of the "Chicago," under my initials.

Mr. LILLICK: But what I desire to elicit from the witness is the number of tests, and I am going to follow that up.

Miss PHILLIPS: But the last question you asked the witness was what was his information about the "Chicago." He has now given you a letter that gives the information.

The COURT: Do you want what he actually took, or what his instructions were?

Mr. LILLICK: I am going to follow that up with what his instructions were.

The COURT: You are more anxious to know what his instructions than what he actually took?

(Testimony of Baldwin M. Woods.)

Miss PHILLIPS: The witness can answer only one question at a time, and which one does counsel want him to answer?

Mr. LILLICK: I have already asked him a question.

Miss PHILLIPS: You have asked him several questions, and I [477] do not believe he knows which one to answer.

Mr. LILLICK: I would like to have the question read, or perhaps it would be as well for me to ask another question. I want the displacement given you for the "Chicago."

A. 12,040 tons.

Q. When you were requested to make this test, Mr. Woods, was the request made by the United States Attorney in writing?

A. No. In conference.

Q. Then was some of the information upon which you based your test given to you orally?

A. I think one datum was given me.

Q. What was that datum?

A. The approximate length of the "Silver Palm."

Q. Then all of the other data involved in the test you made are in the form of letters to you?

A. All that I required in addition to the knowledge which I have of testing.

Q. May I have those instructions?

A. I have another letter.

Q. I want the data upon which you based your tests.

(Testimony of Baldwin M. Woods.)

Miss PHILLIPS: I am going to object to counsel's question on this ground, he does not make it specific enough to be intelligible. He is now getting from the witness the basis from which he assumed the "Chicago's" tonnage. Sometime ago he asked the basis of the "Silver Palm" tonnage. He is now asking for the general instructions. I want to point out that this witness is probably going to be called to testify in another part of the case. I think he should be specific in his question as to the instructions that he wants to know, not general instructions.

Mr. LILLICK: I am cross-examining this witness with a very definite purpose in view, and I have a right to have from the witness his instructions relative to the tests and the data he used in making them.

The COURT: That is pertaining to the testimony that he has given? [478]

Mr. LILLICK: I want from you, Mr. Woods the written instructions you had relative to the tests you were to make which were finally summed up in the diagrams about which I have just been asking you?

A. I was given—

Q. I am not asking you what they contained, I am asking you for them. May I have them?

Miss PHILLIPS: The witness has said part of the instructions were oral. Counsel is not letting the witness answer.

(Testimony of Baldwin M. Woods.)

The COURT: You are asking about the written instructions?

Mr. LILLICK: I am asking for the written instructions.

The COURT: He wants the written instructions.

A. I think I should explain to some degree what they are.

Mr. LILLICK: I will give you that opportunity.

The COURT: There is no objection to your explaining, if you wish, but he wants to see the writing.

A. I think there is a misconception concerning the test. I will be happy to hand over what I have in the way of instructions, but as far as the instructions go I have received none except to make such a test as was desired. In the way of information, I received information concerning the length and displacement of the two vessels, and a digest of testimony given by officers of the "Chicago" in the Naval Court hearing on the subject.

Mr. LILLICK: What I want to find out is that in order to be able to find out upon what you base this diagram.

Miss PHILLIPS: Which diagram are you referring to now?

Mr. LILLICK: Exhibits 9-A, 9-B, and the other two exhibits.

(Testimony of Baldwin M. Woods.)

A. Your Honor, I cannot swear that I include everything, because I cannot be certain, but I will be glad in case of an omission to supply it. As far as I now remember I am supply you with the information requested.

The COURT: He is only asking for the written instructions [479] and not the oral.

A. That is the other letter in addition to the one that was mentioned. This is Admiral Laning's digest, that is Captain Simons, Lieut.-Commander Gray, Second Class Seaman Demer, Ensign Leeds, Seaman Lemire. I do not certify that every one of these has something in it that applies to the test.

The COURT: It merely shows what they displayed to you?

A. Yes. I read all of this and from this material I set up the framework for the test. This is Lieut. Minter, Lieut.-Commander Colton, John A. Kershaw, chief engineer, and maybe the officers of the "Silver Palm," the depositions, I think I have an abstract of those. I am afraid I have not them here.

Mr. LILLICK: Q. How many tests did you make before you finally made the models that you were using come into the position shown on Government's Exhibit 9-B?

A. Do you mean how may trial passes or how many tests which I considered to simulate the conditions?

Q. How many trial passes?

(Testimony of Baldwin M. Woods.)

A. I don't remember. I should estimate two or three. The point is that I discarded every experiment which in my judgment did not give the conditions which I was trying to get, I did not record it. In every case where impact was observed at the angle and under the speed which I was attempting to get I recorded the results, or indicated that it was a check of previous results.

Q. How many times did you actually put the two models on opposite courses, with the "Silver Palm" on a course approximately 40 degrees off the "Chicago's" port bow and bring the vessels toward one another—how many times did you do that?

A. Bring the vessels to the position shown here?

Q. Bring the vessels toward each other.

A. You mean with the prows in opposite directions? [480]

Miss PHILLIPS: I do not believe I understand the question, and I would like to have counsel repeat it, because I don't know exactly what it is.

Mr. LILLICK: My question, it seems to me, is simplicity itself.

The COURT: He has stated there were about forty experiments. I presume there were a number of times he was not satisfied and he abandoned them. Are you asking for all of these, or the time they actually consummated the test?

Mr. LILLICK: I want to know how many times he tried the experiment.

The COURT: He has testified forty.

(Testimony of Baldwin M. Woods.)

Mr. LILLICK: But that was on direct examination yesterday, and I am going into it more fully.

The COURT: Of course, I want to understand the question, myself. As I understand it you are asking how many times the problem was actually worked upon by him, not how many times he started it and possibly did not consummate it, because he did not get the proper data.

Mr. LILLICK: Let me repeat the question: With the model of the "Chicago" in your tank and a model of the "Silver Palm" in your tank, on a course of approximately 40 degrees on the "Chicago's" port bow, how many times did you, before you made this diagram, commence to bring the "Silver Palm" toward the "Chicago," regardless of the speed, how many times did you do that?

A. I should estimate somewhere around forty. Of course, there were cases in which I did not get the impact under the simulated conditions and I did not record them.

Q. That is exactly what I am trying to elicit. I am trying to find out from you how many times did you do that, whether you discarded the result, or not, how many times did you start the [481] model of the "Silver Palm" going toward the "Chicago" on that course?

The COURT: Whether it impacted, or not?

Mr. LILLICK: Whether it impacted or not.

(Testimony of Baldwin M. Woods.)

A. It is hard to say, I suppose probably forty. When one is conducting experiments he tries to get valid data and proceeds until he gets what he considers a reasonable result, and to say that there were thirty-five or forty or sixty, it would be difficult. I should estimate forty.

The COURT: He is asking you other than that forty. Forty is where you had impacts between the two ships.

A. You mean counting all forms of impact or those which I kept a record of?

Q. He wants to know how many times it was other than the forty, whether you had impacts, or not.

A. Around forty.

Mr. LILLICK: Q. You have used the expression "valid results." What do you mean by that?

A. Whenever an experiment is undertaken, one makes certain basic assumptions. Among the conditions which might be called primary conditions, or which were controlling, if in the course of an experiment, due to any cause, one fails to get a combination which he assumed that he was working with then the results of that particular performance are invalid. This might result from one of many causes. If instruments are being used one might fail to operate. In this case if the impact was on the stern the experiment was not valid. If the impact was full abeam it was not valid. It was therefore neces-

(Testimony of Baldwin M. Woods.)

sary to control the experiments and consider only tests which met the conditions.

Mr. LILLICK: Q. So that you would say a valid result came when you managed to get the model of the "Silver Palm" impacting the port bow of the "Chicago" at an angle of 40 degrees? [482]

A. Yes, and the speeds were as when attempted for the particular test.

Q. How many times did you get the model of the "Silver Palm" to strike the port bow of the model of the "Chicago" at an angle of 40 degrees?

A. I could count them.

Miss PHILLIPS: Are you assuming now any particular speed of the "Chicago"?

Mr. LILLICK: May we have the question read, your Honor?

The COURT: Read the question.

(Last question repeated by the reporter.)

A. If I may include all cases of speed for the "Chicago," I have recorded nine cases, but when I stated forty a while ago I included perhaps ten or fifteen trials which took place before I recorded, which I regarded as ranging trials to gain control of the equipment.

Mr. LILLICK: Q. Let us take as a starting point the nine times that you were able to make the model of the "Silver Palm" strike the port bow of the model of the "Chicago" at approximately a forty-degree angle. At what different speeds dur-

(Testimony of Baldwin M. Woods.)

ing those nine times did you assume the "Chicago" to be making?

A. A speed at rest plus or minus approximately one knot, forward 6 knots, and astern 4 knots.

Q. So that in each instance you made three with the "Chicago" at rest, three with the "Chicago" at an estimated speed of six knots, and three at an estimated speed of four knots in reverse?

A. No, they were not evenly divided. The experiments which gave the result shown in this diagram—

Miss PHILLIPS: Let us have that in the record, what diagram?

A. 9-B. The results shown in this diagram 9-B follow five of the recorded trials, the "Chicago" having zero speed in all five. That, however, would include a slight variation, [483] perhaps as much as half or three-quarters of a knot forward or aft for the "Chicago." I might say in the non-recorded trials the results were completely harmonious with this record, but the recorded cases set down were typical.

Mr. LILLICK: Q. Why did you not record the others?

A. It is a matter of laboratory practice to record only enough data to give a satisfactory, to give a validated or repeated result.

Q. Will you explain to me how you obtained the speed of, was it, 1.7 feet per second?

(Testimony of Baldwin M. Woods.)

A. Yes, by reduction, ten knots; it should be remembered that a knot is 1.15 statute miles.

Q. Pardon me, may I interrupt you? I meant how did you do that, what was the physical operation, not the computation, but how did you physically make the model of the "Silver Palm" move through the water at that rate of speed?

A. Shall I describe the method which we discussed yesterday?

Q. Exactly. Let us take the size of the pool. What was the size of the pool?

A. The pool is about 160 feet long, irregular in shape. I am trying to think of something that simulated its form. It is narrower at the lower end and broader at the top end. It is about 60 or 75 feet wide at the top end.

Q. Is it a cement basin?

A. Yes.

Q. With cement steps around the sides?

A. I do not understand.

Q. Is there a cement wall around the sides of the pool?

A. Yes, there is a cement wall around it.

Q. At which end of the pool did you perform the experiment?

A. At the top end, the broad end.

Q. Its width was what?

A. I think 60 or 75 feet, I think nearer 75.

Q. Where did you perform the experiment, at a corner or at the end?

(Testimony of Baldwin M. Woods.)

A. There is no corner. The end is rounded, somewhat elliptical or circular in shape, semi-circular, and the models were [484] pushed out, manipulated with strings and rods—pushed out free of the edge, so as to avoid boundary effects. The models, of course, glide through the water; when you give it a little push it will move out twenty-three, or forty feet without difficulty, and then it may be started with a pull of the string and brought up to the speed.

Q. What happens to the string then?

A. The string then falls in the water.

Q. Falls in the water?

A. Yes.

Q. How long was the string that was used in the models?

A. About 20 feet, maybe 30. We had different strings.

Q. Who pulled the string?

A. I manipulated the "Chicago" and my assistant, Mr. Vogt the "Silver Palm," throughout.

Q. And when you pulled the string from the initial position out from the edge of the pool did you have to move around from the place where you were standing?

A. It was necessary in each case to get the proper alignment, and for that purpose we moved about quite a bit.

Q. How did you get a proper alignment for the 40 degrees approximate course?

(Testimony of Baldwin M. Woods.)

Miss PHILLIPS: If your Honor please, counsel says "course." The witness has been testifying to 40 degrees angle of impact. He has not testified to 40 degrees course.

Mr. LILLICK: Thank you, Miss Phillips.

Q. Bearing in mind what Miss Phillips has just stated, how did you get that?

A. The models are pushed out. The model of the "Silver Palm" was pushed out on the water until the length of the string had been used up; usually in order to avoid its starting back to us too promptly we slowed it down near the end, and then gently pulled it into the correct direction, and a pull was exerted and then an operation, similar operation, was performed with the "Chicago," estimating the probable location in [485] the degree of impact, so as to have the vessels arrive there simultaneously, and in the right relative positions. That required a certain amount of practice.

Q. Let us take a typical test that you made. Your assistant would be on one portion of this rounded pool?

A. Yes.

Q. And you on another?

A. Part of the time we were both together and other times apart.

Q. Let us take a typical example of what you did, when you had the "Chicago" model moving at the rate of speed of 6 knots an hour, and the "Silver Palm" at 12 knots, and tell me just what you did,

(Testimony of Baldwin M. Woods.)

where you stood, where your assistant stood, whether you handled the "Chicago," or whether he handled the "Chicago," and where the strings were used on the respective models, and give it to me definitely and in detail, as you would for a laboratory experiment; give it to me so that I could take it to another expert and show him the way it was tested and let me know the result.

A. Can I use the blackboard?

The COURT: You may if you want to.

Mr. LILLICK: I wonder if you could do it on a piece of paper so that we might have it in the record.

Miss PHILLIPS: I might say that counsel requested last night that the witness bring over his models, and they are in court. I presume counsel had some idea in that.

Mr. LILLICK: I will use them.

The COURT: Is that paper suitable?

A. Yes. This is the deep end of the pool. This line indicates roughly the walk, the cement walk running around it. The position at which we calibrated or determined or got the speed was along the side, where there are foot marks running for a number of feet, I have forgotten how many, certainly in excess of forty, because we used up to thirty of forty. [486]

Q. Might I ask you, Professor, to indicate on this one, because it will be part of the record, the foot marks, and by a legend designate it?

(Testimony of Baldwin M. Woods.)

A. I could on reasonably short notice obtain a diagram of this pool, if it is of particular significance, from the University. At this end there is a small step out here which overhangs the water, which proved quite convenient, it may have been used for diving off, I suppose.

Q. May we put "Deep end," please, there?

A. Yes. Ordinarily, in a typical test of the type which has just been mentioned, Mr. Vogt, my assistant, might stand here, and I would stand here. I wish it understood that this is a typical test, because we moved so as to have the collision occur at different places. The "Chicago" in such case would be drawn in this general direction. I would hold my hand out and pull it.

Q. Will you give us the distance between the point where you stood and where Mr. Vogt stood?

A. It varied so much that I would hesitate to give any distance as technical in one case. It might have been ten or fifteen feet, and in cases less.

Q. I have asked you for a typical example, and have understood this to be one. If you will, give me the approximate distance between where you and Mr. Vogt stood?

A. Say six to fifteen feet. Vogt would push this other vessel, the "Silver Palm," out into a position such as this and get an angle of about 40 degrees here, and would start this vessel on its course.

Q. May we put in the name of the vessel?

(Testimony of Baldwin M. Woods.)

A. Yes. We used a much longer string for the "Silver Palm" in order that it might be started on its course and could be observed before the "Chicago" was started, so as to control somewhat better, and have fewer mistrials, as it were.

Q. How long was the string from Vogt to the middle of the "Silver Palm"?

A. From 20 to 30 feet. [487]

Q. How long was the string from the "Chicago" to your extended arm?

A. That is in the case of the six knots?

Q. Yes.

A. Taking the 6 knots, it was somewhat longer than in the case at rest, because I wished to steady it, in case of 6 knots, I should say it was from 20 to 30, perhaps 25 feet.

Q. May we have on one of these the "Silver Palm" distance?

A. Yes. From 20 to 35 feet. This would be 6 to 15 feet.

Q. Did Mr. Vogt and you alone perform these experiments?

A. Yes.

Q. Who timed the models?

A. In the cases where we timed them I usually operated the stop watch.

Q. In how many cases did you time them?

A. We did not time them after we had found we were getting approximately the same speed time

(Testimony of Baldwin M. Woods.)

after time, except toward the end, when we timed one to make certain.

Q. With this example, I may be mistaken as to it, I understood that five of your nine typical tests—I am not sure that you called them typical.

A. Recorded.

Q. Recorded tests, were made with the “Chicago” going at 6 knots. Am I right about that?

A. No, at rest, approximately.

Q. How many tests did you make of the type that you are now describing with the “Chicago” at 6 knots?

A. We made only one recorded test. We made several more.

Q. By “several” you mean how many?

A. At least three.

Q. These results which you have given us in your diagram of the position of the “Chicago” going at 6 knots was, in all, after how many tests?

A. I do not understand.

Q. You a moment ago said that you had three tests, as I remember.

A. At least three.

Q. At least three?

A. Yes.

Q. So that you would say that the final result that you have here is that of but one test after your other three? [488]

A. But one recorded test.

(Testimony of Baldwin M. Woods.)

Q. But one recorded test?

A. And the non-recorded tests which were in agreement.

Q. And in that one recorded test, it is my understanding that U. S. Exhibit No. 11 is the result, is that so?

A. No, that is astern.

Q. Exhibit No. 10 gives the result?

A. Yes.

Q. And with that result you came to the conclusion from the four tests that the "Silver Palm" and the "Chicago" would not swing so that they would have their bows in the same direction?

A. Yes, we came to that conclusion. We considered it adequate.

Q. In other words, from the tests, U. S. Exhibit No. 10 demonstrates that with the collision between the "Silver Palm" and the "Chicago," with the "Chicago" proceeding ahead at six knots an hour, and the "Silver Palm" proceeding ahead at 12 knots an hour, and the "Silver Palm" striking the "Chicago's" bow at an angle of approximately 40 degrees, the "Silver Palm" would have sideswiped the "Chicago" and gone on aft of the "Chicago"?

A. Yes—I beg your pardon, not have gone aft; it would depend upon the amount of damage in the side-swiping.

Q. But in any event, with these speeds, and at that angle, the "Silver Palm" would not, after the

(Testimony of Baldwin M. Woods.)

collision, have had her stern swing around to her right as I have just indicated?

A. It would not.

Q. Can you tell me whether in considering what would have happened with relation to your experiments, and this diagram as it appears before us, you would have come to the same conclusion if you had known that the "Silver Palm" crashed into the "Chicago" for a distance of—I am not certain, Miss Phillips, 30 to 35 feet, is that a fair statement?

Miss PHILLIPS: I don't think that much. I would not be sure how much she crashed in. The ruler will show that, because [489] the scale is $1/16$ of an inch. That is the reason I had this model made to scale, so that we could compute things like this.

Mr. GEARY: It is $18/16$; it would be roughly 18 feet.

Mr. LILLICK: May I have my question read as far as I have gone?

The COURT: Read the question.

(The question was read by the reporter.)

Mr. LILLICK: (Continuing)—for a distance of 18 feet proceeding at 12 knots an hour?

A. I could not answer that question "Yes" because the diagram represents the result and not a conclusion. In other words, if I was to give my conclusion I would have to add to the result of the experiments as exhibited in the diagram, which is a true picture of the final position the effect of the

(Testimony of Baldwin M. Woods.)

glancing or side-swiping blow which was delivered. The effect of that side-swiping blow would have been evidenced first in the character of the damage done to both vessels; there should have been a severe shearing to the port side of the "Silver Palm," possibly taking the prow off, due simply to the fact that at the time of the impact that there was evidently a high tangential velocity at once; the acceleration there represented would be a measure of that tangential force which would tend to shear off the prow of the "Silver Palm" and would also tend to make a much longer gash, not a V gash, but a long gash in the side of the "Chicago."

Q. Do you know anything about the type of construction of the "Silver Palm" in her forepeak, with the shell plating, the timbers, the frames, and what the body of the "Silver Palm" is at her bow?

A. No more than is revealed by the photograph which I examined.

Q. And yet, with the examination you have made of this photograph, you would have said that in a collision between the [490] "Silver Palm" and the "Chicago," had the "Chicago" been going at a rate of 6 knots an hour, the "Silver Palm's" bow would have been sheared off if she had been coming at an angle of 40 degrees, approximately, or 45, with a speed of 12 knots an hour?

A. It would have been bent or crushed to port.

Q. But you said "sheared," Mr. Woods. What did you mean by that?

(Testimony of Baldwin M. Woods.)

A. When I answered that question, or a similar one, yesterday, I said either sheared off or bent strongly to port. The photographs examined showed no such damage.

Q. Did you have the shell plating of the "Chicago" in mind—did you know how thin her shell plating is and the condition of her frames?

A. Yes.

Q. Did you have that outside of the photograph?

A. I have not it in written form but I have seen it in written form.

Mr. LILLICK: We offer the drawing of the witness as our next exhibit.

The COURT: It will be received as Respondent's Exhibit 9.

(The drawing was marked "Respondent's Exhibit 9.")

Mr. LILLICK: Do I understand that U. S. Exhibit 9-B really represents the position into which your two models finally came to rest in the water at the conclusion of the test?

A. It represents the position to which they came at the close of the test, but not the position to which they might have drifted had they been left alone.

Q. What do you mean by "at the conclusion of the test"?

A. I mean that the effects of the impact had exerted their full influence.

Q. Wouldn't you say that was after they came to a position of rest?

(Testimony of Baldwin M. Woods.)

A. No. In conducting any experiment in fluid, nothing which you would place out on the fluid would stay at rest. You could put it at rest, but it won't stay there; consequently, one must observe up to the point where the drifting around of the [491] object begins to vitiate the result. That point is very definite.

Q. Did you take into consideration the wind at the time of the collision?

A. No. In the model tests there was no wind, at least by "no wind" I mean a movement of less than 50 feet a minute. That is the figure of the Society of Heating and Ventilating Engineers. In interpreting the result it is possible to consider the effect of wind. I have not given any consideration to it because of the relatively low value of the force.

Q. Mr. Woods, I asked you only whether you had considered the wind in connection with your experiment.

A. In the model test there was no wind.

Q. I think you said yesterday that a difference of between 15 and 20 per cent in the speed used by you with your model of the "Silver Palm" made no difference in the actual results.

A. None that we could discern.

Q. So that a difference of two knots an hour, we will say, in a 20-knot speed, would not alter, in your opinion, the result if a collision occurred between two ships?

(Testimony of Baldwin M. Woods.)

Miss PHILLIPS: Just a moment: Counsel is not stating what the witness has said.

Mr. LILLICK: I know I am not, I am asking a question.

Miss PHILLIPS: He has not said any such thing.

Mr. LILLICK: I know he has not, but he is an expert, and I have a right to state it in another way. May I have the question read?

The COURT: Read the question.

(Last question repeated by the reporter.)

Miss PHILLIPS: That is objected to as irrelevant. Nobody has testified that the "Silver Palm" hit the "Chicago" at a 20-knot speed. [492]

The COURT: The witness has not assumed that she hit the "Chicago" at 20 knots speed at any time in the experiment. If the 20-knot speed was used, could you answer?

A. I could only answer in regard to the energy involved.

Mr. LILLICK: Q. To put it differently, Mr. Woods, if I understand the distinction you are making, a difference of 15 and 20 per cent. in the speed used by you for the "Silver Palm" test might or might not be used for a lower speed?

A. I can only answer the question by describing or stating the results. The results of the test indicated that the final position assumed by the vessels was independent of the variation, that is, independent within the limits of ordinary errors of observa-

(Testimony of Baldwin M. Woods.)

tion, independent of variation of as much as between 15 and 20 per cent. variation in speed of the "Silver Palm."

Q. But I understood you to say between 15 and 20 per cent. Does the ratio of 15 to 20 per cent. used by you as to the speed in this experiment of 12 knots apply to the lower or higher rate of speed?

A. I could not say without computing the particular case.

Q. Upon what did you base the percentage of 15 or 20 per cent. that you used as to the variability giving the same result?

A. We based that upon the maximum variability of the speeds obtained by our simple method of pulling with the string.

Q. I think you testified to this yesterday, but I want to be sure it is in the record: The velocity that you measured in making this diagram was a velocity that you computed as being that of the "Silver Palm" at the moment of impact. Am I right about that?

A. Yes, to the best of my knowledge.

Q. Why do you say to the best of your knowledge?

A. Because I do not know the velocity of the "Silver Palm" at the moment of impact. I have taken an assumed velocity and a sufficiently [493] wide range to take care of velocities near that one in case that should not be correct.

(Testimony of Baldwin M. Woods.)

Q. What was that range of velocity?

A. The range was, as stated a few minutes ago, 15 or 20 per cent from 12 knots.

Q. So that your model of the "Silver Palm" struck the model of the "Chicago" at a rate of speed, relatively speaking, and I will use 20 per cent, of, say, 13.61 knots as the high speed—am I correct?

A. That is 14.40.

Q. I think I had better reframe the question, because it would be confusing. So that with the range of variability which you say would have made no appreciable difference in result, your experiment resulted, in your opinion, in having the model of the "Silver Palm" strike the model of the "Chicago" somewhere between a speed of 9.61 at low or 14.40 knots at high, using 20 per cent as an outside limit?

A. No, I meant by 20 per cent a general spread

Q. A general spread?

A. The spread which you have given is 40 per cent.

Q. Then it represents a difference in speed at the time of the impact of what? Will you give me the figures on that?

A. 12 knots less 10 per cent would be 10.8, and 12 knots plus 10, would be 13.2.

Q. You kept no tabulation of unsatisfactory tests, as I understand it.

A. No. We kept tabulations of every test that appeared to simulate the conditions and give anything significant.

(Testimony of Baldwin M. Woods.)

Q. And again that was the No. 5 with the "Chicago" from 1 to 2 knots?

A. Recorded 5.

Q. Recorded 5?

A. Yes.

Q. And with the "Chicago" going 6 knots per minute?

A. One recorded and at least three others.

Q. Did you ever conduct any tests in the testing pool at Washington?

A. No. [494]

Q. And do you remember how long that pool is?

A. Approximately, I think it is 400 feet long. I do not wish to have that interpreted too literally. I can get figures, but it is about 400 feet long.

Q. As a matter of fact, that is near enough to be right, but I think it is 500 feet. Approximately how wide is it?

A. I should judge it is 25 or 30 feet wide.

Q. How long were you there at the testing pool?

A. At Washington?

Q. Yes.

A. I merely visited the pool for a day on two occasions.

Q. You saw them making tests, did you not?

A. Yes, I was conducted through by one of the officers who was familiar with the testing and discussed the operation with him, a subject that I have studied from time to time.

(Testimony of Baldwin M. Woods.)

Q. The testing appliance there has a traveling carriage over the tank that runs the full length of the tank, has it not?

A. It has what I call a car.

Q. Operated by an electrical device?

A. Operated by electric motors.

Q. And in making a test, the model being tested is suspended from the center of this car or carriage, is it not?

A. It is allowed to float in the air, it is attached in an appropriate position giving freedom of vertical motion.

Q. But suspended over the center of this car?

A. By suspended, I connote always observing something that is floating, so I cannot say suspended, but attached.

Q. You explain it to me. There was a means provided for an absolutely accurate test of the speed with which the model was propelled through the water?

A. Yes.

Q. And that absolutely accurate test of speed was applied through the model being attached to this traveling carriage?

A. A dynamometer was used to measure the resistance offered. These tests [495] are not run, however, for the purpose for which we ran ours. They are run to determine the resistance, coefficient of effect of wave motion, effect of modification of form of ship lines, on various characteristics of the vessel. The art of model testing has reached a point

(Testimony of Baldwin M. Woods.)

now where tests are worth while if they will result in changes amounting to as little as 2 per cent. in power required for a given speed, and things of that sort. Consequently, for testing in which quantities have to be measured with that degree of accuracy the dynamometer system is employed. In the Washington pool unless there has been a recent change they have never used propellers on the models. They test them without and assume that the results are satisfactory. That is not entirely valid, but it is within narrow limits.

Q. In other words, there is a regular basis upon which they work out the bow coefficient and streamline for speed, and then by mathematical computation, knowing about the action of the propellers, they compute what that is, but the real valuable element is the change in the hull, isn't that true?

A. They test the result of many proposed modifications and ascertain whether the proposed changes are beneficial or otherwise.

Q. When were you there, Mr. Woods?

A. I think the last time was in the summer of 1929, and I think the time before was in the spring of 1928 or 1927.

Q. I may be mistaken, but in 1929 I feel that they did use propellers on their models.

Miss PHILLIPS: Just a moment: I don't think that should be stated.

Mr. LILLICK: It may go out of the record.

The COURT: It will be stricken out.

(Testimony of Baldwin M. Woods.)

Mr. LILLICK: Q. The pool in Washington, in fact all of these testing pools are covered, are they not—with a roof, I mean? [496]

A. The reason I hesitate is according to my recollection the latest one is not covered over its entire roof. The latest is the testing pool of the National Advising Committee for Aeronautics at Langley Field. They have one for testing at that field with a car that will make a speed of at least 50 miles per hour and a course of nearly 2500 feet.

Q. This is in the air that you are speaking of?

A. The National Advising Committee for Aeronautics has one which is perfectly adapted to test aeroplane floats or hydroplanes. It covers the widest range. It is at Langley Field. Such a length is not at all necessary.

Q. You mentioned rods, that you used rods in your experiments. What did you do with the rods?

A. A string does not resist compression and consequently when one wishes to hold the model some distance out, to avoid a boundary effect, a rod is used. If one holds it with a string he can keep it from drifting away, but not from drifting toward him. With a rod he can prevent that.

Q. Were you each armed with a rod in this test?

A. Yes.

Q. So that if the model moved, either from the wind or even a slight motion in the water, you could push it back with your other hand?

A. Well, that was not possible for Mr. Vogt with the "Silver Palm," which was further away,

(Testimony of Baldwin M. Woods.)

and in fact it was soon discovered that if one used a stick that was enough. One could construe the position and then one with the stick could start the controlling moments when he got the conditions right.

Q. Let us take the model that we have here, of the "Chicago," is it?

A. Yes, that represents the "Chicago."

Q. In order to cut her away, what did you do with respect to apparently the superstructure?

A. This model happens to have been prepared sometime ago for some rolling and pitching tests [497] of vessels, and it has some equipment on it we left on at the time of the test, because it had no particular influence on the operation of the vessel. We weighed it, and this upper portion of metal which you see was not built at that time. It had been on for some time.

Q. But in any event, the model as it is here before us is that model that you used to represent the "Chicago"?

A. Yes.

Q. And you put weight inside of this space?

A. My recollection is that the "Chicago" did not need any weight, but that the "Silver Palm" did. In other words, our only concern was to get a ratio of about 13 to 12 in weight. It did not make any difference as to which one we applied the weight.

Q. Are you sure of that? You say you do not

(Testimony of Baldwin M. Woods.)

recollect. I would like to know whether you put anything in this to make it weigh more than it apparently weighs now. Will you look at your notes?

A. My notes do not say. They tell me the total weight, however, which would make it very easy to determine. The "Chicago" weighed 8.9, as we tested it. I think nothing was put in it.

Q. Did you take into consideration the draft that you obtained from the information that was sent to you by the United States District Attorney?

A. In the test?

Q. Yes.

A. We considered the models to have sufficient draft to make accurate analysis unnecessary.

Q. And to put it differently, with the models you used you assumed draft would make no difference?

A. Correct.

Q. Can you tell me whether you took the same position with respect to the pivoting point on the "Silver Palm", and on the "Chicago"?

A. Yes.

Q. In other words, you felt that regardless of how the "Silver Palm" might be loaded with this 8000 odd tons of cargo, or 7000—what was it? [498]

Miss PHILLIPS: The master did not seem to know. He testified between 6000 and 8000, I think.

Mr. LILLICK: Q. Between 6000 and 8000, to correct that, that the pivoting point would make no difference?

A. We assumed that the change in the position of the pivoting point occasioned by the cargo would

(Testimony of Baldwin M. Woods.)

not bring it substantially away from the position of the pivoting point of the model.

Q. And yet you know nothing about how the "Silver Palm" was stowed?

A. Except from a picture taken, reputed to be taken just after the accident showing the stove-in front end which showed an exposed portion of the water line.

Q. Any cargo showing through the opening?

A. No, but the trim of the "Silver Palm" was shown.

Q. Did you know the "Silver Palm" is a vessel with refrigerating compartments?

A. No.

The COURT: We will take a recess now until 2 o'clock.

(At this time a recess was taken until 2 o'clock p.m.) [499]

Afternoon Session.

BALDWIN M. WOODS

recalled

Cross Examination Resumed.

Mr. LILLICK: Q. Mr. Woods, just before recess I think we were discussing the model which was used of the "Chicago". I understand you have forgotten whether you used any weights in the hull when you made this test.

A. I think that I could verify the fact if I might examine it a minute. The weight of the model is on

(Testimony of Baldwin M. Woods.)

it somewhere, but I have forgotten just where it is. It is my recollection that there were no weights in it. I would say this, that I have no doubt that my assistants could find the weight on it.

Q. Now you will notice what are apparently weights attached to movable rods. Do you know whether you used the model in that loose condition?

A. They were tight at that time. This model has been in use for other purposes. These weights are to be used for varying the metacentric of the vessel and conduct certain rolling and pitching tests by our students, advanced students.

Q. And your recollection is that these weights on the sliding bar which is intended to be raised and lowered were in the position where they were down low in the hull?

A. In the approximate position as at present.

Q. When you performed these tests were the little cleats on the bottom of the model?

A. Yes.

Q. Take that first cleat and figure it from the dimensions of the vessel itself, what would you say the width and depth of that cleat would have been on the "Chicago" had her bottom had three sets of cleats?

A. I can answer that from two points of view, one from the dimensions as given here, or from the point of view of the effect.

Q. I am asking you only for the dimensions.

(Testimony of Baldwin M. Woods.)

A. I will have to have a ruler.

Q. You have a ruler.

A. About twelve feet long and about six feet projection.

Q. So that on the model as it represents the "Chicago" in other respects, there would have been cleats, or what do they call them on yachts when they go down and come up?

A. I don't remember. I don't remember the terminology. Are you interested in the purpose of these cleats?

Q. I am only asking the question and trying to identify what these would be on a flat bottomed boat, and when we pulled that up—Is that a center board?

A. Center board.

Q. So that on this model there were three what are called center boards that, by your calculation on the "Chicago" would have been twelve feet long and six feet deep?

A. Yes.

Q. As to the bow of your model, the one we are examining, you do not claim, do you, that it is a bow that could be deemed to have been a duplicate of the bow of the "Chicago"?

A. For the purposes of the tests, yes.

Q. How about the stern, would you say that for the purposes of the test we could take the stern of this model as being similar to the stern of the "Chicago"?

A. Yes.

(Testimony of Baldwin M. Woods.)

Q. I call your attention to the model of the "Chicago" that has been introduced in evidence, and the manner in which her stern is cut away flat and up. Is it your testimony that with the rudder of the "Chicago" as indicated upon the exhibit which has been introduced in evidence, that with that flat cutaway stern it would have resulted in the same action on the "Chicago" as in your experiment it resulted from the manner in which the stern of this model is cut away?

A. Practically, yes.

Q. Your relative measures involved, as I understood you yesterday, are a scale of 1 to 150: Is that right?

A. Yes. [501]

Q. Is it not true that any error made by you in your tests would be magnified 150 times?

A. There is no relation at all between that measure in that test that you have spoken of. There are many relations. They depend upon the theory of dynamic similitude which is the basis of a model test, and the ratio of one quantity, on the full scale of the prototype, to the corresponding model in the model, varies according to the physical quantity considered. For example resistance may vary according to the amount of the ratio, the power according to another, and so on; it is the rate of variation of these quantities that determines the effect of error.

Q. What did you mean yesterday by a 1 to 150 comparison?

(Testimony of Baldwin M. Woods.)

A. I mentioned the scale ratio of 1 to 150 as a basis for determining the speed for the models which would correspond in its dynamic effect to a given speed for the ship.

Q. Perhaps I am only half way correct. The relation of 1 to 150 applied, then, only to the kinetic energy and not the distance between the ships?

A. No. When you refer to ships, their dimensions, there is a geometric pattern. When one uses a model at a scale ratio of 1 to 150, let us say the model is 1/150 in length of the prototype, he sets the new pattern so that it would resemble a reduced photograph of the large pattern, in which everything shrinks by the rate of 150 to 1.

Q. Then if, in the reduced photograph there is an error in your denominator of 1, it will be magnified 150 times, would it not, if there be an error?

A. Errors are considered in terms of percentage. An error of 1 in a length of 4 feet would correspond to an error of 150 in a length of 600 feet.

Q. I am a layman, Professor Woods, and I am trying to understand what difference would be made in a mistake or an error made with a model of the type we are discussing. Will you explain [502] that to me?

A. The subject of errors is a very complex one. I can give you an example, however. In a test on ship models in which they have varied the ratio between draft and beam, if the draft be the numerator and the beam the denominator, from the value approximately of 1 to a value of 4 for giving varia-

(Testimony of Baldwin M. Woods.)

tions in the total power required to propel the ship of about 6 per cent. For a ratio of 1, the beam and the draft are equal, and that typifies a narrow ship. For a ratio of 4 you have a very wide, flat ship, the beam is four times the draft. With that wide variation which covers nearly all types of ships, the total variation in power for the same speed and the same displacement is about 6 per cent.

Q. Now going back to 1 to 150. This model, as I understand it, is 150 times smaller than the "Chicago" insofar as length is concerned?

A. Yes.

Q. By the use of this model you could by pulling the string sufficiently strong attain a speed in split seconds by the use of this model, that multiplied by 150 would run into, let us say, a very rough estimate, for another 200 knots an hour, could it not?

A. By pulling enough, yes.

Q. Then coming back to the question I asked you, wouldn't an error made in the use of this model 150 times smaller than the "Chicago", if reflected in the ship itself, be magnified by 150 times?

A. No. The percentage of error may not be modified at all between the two cases. The main advantage of the model is that very frequently it is possible to measure quantities which, for the prototype could not be measured. The accuracy of measurement for the model can frequently be made far greater than that for the prototype, for certain purposes, and therefore one actually gets greater ac-

(Testimony of Baldwin M. Woods.)

curacy for determination with the model than with [503] the prototype.

Q. Then putting it the other way, it is your testimony that an error made by the use of a model would not be magnified 150 times?

A. No.

Miss PHILLIPS: I think I will have to object. That is the third time counsel has asked that question in the last five minutes.

Mr. LILLICK: I am asking it another time.

The COURT: Of course he has answered twice in this way, as I understand it, that it is a matter of percentages and not a matter of multiplication. That is correct is it not?

A. Yes.

Q. The percentages remain the same?

A. The percentage could very well remain the same, and does in many cases.

Mr. LILLICK: Q. Would you say that it did in this case, bearing in mind that your model has no superstructure, has no comparable features in reference to the "Chicago" in the way of draft, in the way of coefficient at the bow, or in cutaway at the stern?

A. It is my estimate that a rough piece of lumber slightly faired at the end, say of the dimensions 2 by 8 which would float in the water vertically would have given substantially, within a moderate percentage of error, the same result as the present model.

(Testimony of Baldwin M. Woods.)

Q. Then the use of the present model in the test—the test could just as well be made, in your opinion, if it was made with a piece of wood, as you have described?

Miss PHILLIPS: Just a moment; counsel's question is now so general that it is not intelligible, the use of the model in what test, for what purpose? He should make the question more specific.

Mr. LILLICK: I will try to make it specific.

Q. Then taking your testimony, do you say that the tests in the [504] basin at Washington for the purpose of computing speed, might just as well be made with blocks of wood as with a finely-drawn model?

A. No.

Q. Then you did not mean a few minutes ago, that a block of wood of the same shape as the "Chicago" as to length, could be used to compute the speed of the "Chicago"?

A. No.

Miss PHILLIPS: And the witness did not say so.

Mr. LILLICK: Q. When you were making these tests at the pool over in Berkeley, did you notice whether the model of the "Silver Palm" as it approached the "Chicago", when the "Chicago" was moved at an estimated speed of six knots an hour, had any tendency whatever to turn just before the two came in contact?

A. I did note in all of the cases that there was no appreciable tendency to turn as the model repre-

(Testimony of Baldwin M. Woods.)

senting the "Silver Palm" approached the "Chicago" in the model test.

Q. What would have been the effect had the model of the "Chicago" been only a blunt piece of wood?

A. For the analysis of the impact the relative position and mass at the time of impact,—the relative position of the masses at the time of impact, and the velocities are determining factors. Had the model of the "Silver Palm" been a slightly faired piece of wood as I have described a moment ago approaching the "Chicago", the result would not have been materially different.

Q. Were your tests intended to demonstrate particularly the kinetic energy involved in the impact?

A. No.

Q. What were they intended to result in, then?

A. They were intended to ascertain what positions the vessels would assume after the impact, under a variety of initial conditions of speed, with the maintenance of a fixed point of impact, and a constant angle of approach.

Q. In the approach of the "Silver Palm" to the "Chicago" with [505] these models, is your initial velocity greater than that at the time of the impact?

A. In nearly every case it is.

Q. As you cover the 15 feet—I think you said 15 feet.

A. Or more.

(Testimony of Baldwin M. Woods.)

Q. The 15 feet or more, in covering that 15 feet with your model of the "Silver Palm" is it my understanding that you give it the initial pull and then permit the speed to decrease or increase? What do you do?

A. To decrease.

Q. To decrease?

A. Yes, and in a few cases we maintained a pressure to keep the speed about constant until we were close to the point of impact.

Q. Did these experiments turn out with a satisfactory result?

A. I should have to define "satisfactory". If you mean that we obtained the attempted initial condition and obtained an impact at an angle of 40 degrees with the speed which we had attempted, I should call that a satisfactory experiment. The results take care of themselves. The results were not different.

Q. Did you measure the velocity once you finally obtained 12 knots an hour at any other point between your commencement of the movement of the "Silver Palm" and the final impact?

A. We did not measure it. We had practiced obtaining approximately 1.7 feet per second which corresponds to 12 knots, and were able to give the vessel that velocity. It did not diminish materially from that value.

Q. In other words, you practiced for a time on pulling the model of the "Silver Palm" through

(Testimony of Baldwin M. Woods.)

the water, and timed it before you finally performed the test?

A. Yes.

Q. How many times did you do that?

A. Three or four times.

Q. I notice a little red string at the ring bolt attached to what I think you mean to be the bow of the "Chicago"?

A. Yes.

Q. That was the type of string you used?

A. Yes, I have a further sample. [506]

Q. This is the type of string that was dropped in the water?

A. Yes. It was probably one of those used. It was picked out of the boat this morning.

Q. I understood you to say this morning that actions of the rudder would have made no difference in your test?

A. No.

Q. With regard to whether the "Silver Palm" was proceeding at a rate of 12 knots an hour at the time of the impact and had been on a hard right rudder for a half or three-quarters of a minute or a minute before that?

A. It would make no difference. The conditions at the point of impact would have been modified had either vessel been turning materially. Therefore the conditions at the point of impact were assumed to begin with and the vessels brought together under those conditions.

(Testimony of Baldwin M. Woods.)

Q. What was the condition that you assumed at the time of impact?

A. Between 10 and 12 knots of speed for the "Silver Palm" at an angle of 40 degrees between the major axes of the two vessels.

Q. Without regard to the rudder?

A. Without regard to the rudder.

Q. Now in the test that resulted in the diagram, Exhibit 9-B would you say that if the model used by you for the "Silver Palm" had two propellers like those on the "Silver Palm" and the model used by you for the "Chicago" had four propellers like those on the "Chicago" the results obtained by you would have been the same even if those propellers had not been turning?

A. Yes.

Q. And if all of those propellers had been turning the result would have been the same?

A. The result would have been the same. Had all the propellers been turning and had the rudders been placed to a straight position, the result would have been modified by not to exceed two per cent.

Q. If the propellers on the "Chicago" were reversing full speed astern and the propellers on the "Silver Palm" at the time of [507] impact had been started ahead, still there would have been no difference in the result except for that percentage?

A. No, no difference.

Q. I asked you about the "Silver Palm" remaining in the gash after the collision, or until the "Chicago" had been swung over an arc of 50 degrees;

(Testimony of Baldwin M. Woods.)

is your answer now that the propellers on the "Chicago" going at full speed astern and the propellers on the "Silver Palm" just starting ahead, after that joining of the two ships, would have made no more than two per cent difference?

A. Will you repeat that?

The COURT: Read the question.

(The last question was repeated by the reporter.)

A. That is correct.

Mr. LILLICK: Do you have any opinion whatever as to the trim of the "Silver Palm"?

A. Only that from an inspection of the small photograph which I saw.

Q. Was that after the collision?

A. Yes.

Q. Was it while she was lying at the dock at San Francisco?

A. No.

Q. Where was she at this time?

A. If I recall correctly it was reported to have been taken within an hour or two of the collision as the "Silver Palm" was at sea.

Miss PHILLIPS: Might I state for counsel's benefit, I think he can get the picture because I gave it to the witness. It was printed in the San Francisco Chronicle the day following the collision, a picture taken showing the "Silver Palm" with her crushed bow, taken at sea. I have not a copy of the photograph, but counsel I am sure can find it reproduced in the Chronicle. I say the Chronicle, it may be the Examiner, but I am not sure.

(Testimony of Baldwin M. Woods.)

Mr. LILLICK: Q. So that you were assuming, for the purpose of your test, the trim that you saw in that picture?

A. I do not recall that I saw the picture before the test, but I [508] believe so, but the conditions in the test would cover a fairly wide range of the trim.

Q. Would the conditions in the test cover the situation where the difference between the trim you saw in that picture with the forward part of the "Silver Palm" deep in the water because of the cut, make any difference with respect to what she was before?

A. The picture which I saw did not show the prow deep in the water, but in answer to the question I will have to explain by making the comment, I would say that the variation between a vessel deep in the water and one with the prow apparently up, would not affect the results of the model test.

Q. Will a shallow draft vessel turn in the water any more rapidly than a deep draft vessel?

A. It goes back to the design of the rudder. For the same capacity of rudder the shallow vessel will often turn more rapidly than a deep draft vessel.

Q. Then, in your opinion, it would make no difference as to the water drying depth of the "Chicago" and the "Silver Palm" insofar as your models were concerned?

A. No.

Q. The model that I hold in my hand is the model that you used for the "Silver Palm" is it?

A. Yes.

(Testimony of Baldwin M. Woods.)

Q. Can you tell me what the name "Golden boats" means on the model?

A. That means that it is a true model of the lower portion of the Golden boats of the ferry.

Q. You mean the Golden Gate Ferry?

A. I don't know that they are all operated by the Golden Gate Ferry.

Q. I call your attention to what apparently is a false keel on this model and ask you again, with the ruler, to tell me what relation to the 1 to 150, how deep such a boat's keel would have been on the "Silver Palm".

A. Three feet.

Q. Extending the entire length of the model?

A. Yes.

Q. Is it your opinion that with this false keel, had it been on [509] the "Silver Palm" at the time of the collision, had no effect whatever on her turning qualities?

A. It would have had effect on her turning qualities but not the effect perceptible in arranging model tests for the purpose for which these tests were made.

Q. Was the only purpose for which this test was made to determine whether the impact of these two vessels would necessarily result in bringing the two together on almost parallel lines without any other factors than the force of the blow from the "Silver Palm" to the "Chicago"?

A. The purpose of the test was to determine what the resulting positions would be under the special conditions assumed.

(Testimony of Baldwin M. Woods.)

Q. Have you had any practical experience, Mr. Woods, with what happens to two steel vessels when they come in contact at sea?

A. Two steel ships?

A. No.

Q. Have you ever acted as surveyor with respect to the type of damage caused in such a collision?

A. No.

Q. Have you ever seen a vessel other than the "Chicago" that had been in a collision at sea?

A. I find it difficult to remember. I have examined pictures and I have been around the docks, but I do not for the moment recall any.

Q. Have you ever heard that when two vessels of the approximate size of the "Silver Palm" and the "Chicago", and we will assume one of 13,000 tons and the other 12,000 tons, came within a certain distance of each other, that some force brings them together?

A. Yes.

Q. What distance would those two vessels come together in, if they were at rest in the water, vessels of 12,000 and 13,000 tons?

A. That would require a rather careful computation.

Q. I only want an approximation.

A. I would not give any.

Q. What would happen when, they were, say within 25 feet of one another and a swell came along? [510]

(Testimony of Baldwin M. Woods.)

A. It would depend upon the direction and magnitude of the swell as to their position. I have never computed such a case nor conducted any experiments to determine it.

Q. Would it have any effect with reference to a vessel approaching another at an angle of 45 degrees with a swell coming in the angle between the 45 degrees and a line projected from the stem of the other vessel, in reference to side-swiping, in your opinion?

A. It would have very little effect because the thrust involved would rest large upon the surface of the water, whereas the resistance to a sudden turn lies with the under surface of the hull.

Q. I understand there was no one with Mr. Vogt and yourself when these tests were made?

A. No.

Q. You testified, as I understand it, that an observer on the "Chicago", assuming the vessel was going astern, would see increasingly more of the starboard side of the "Silver Palm" and would accordingly gain the impression that the "Silver Palm" was swinging to port. Now if the bearing of the "Silver Palm" remained constant 45 degrees approximately, the angle formed by the courses of the two ships would remain constant, would it not?

A. The angle formed by the courses, yes.

Q. All of the other angles of that triangle would also remain constant, would they not?

A. Which triangle?

Q. Made by the course of the "Silver Palm" of 45 degrees crossing the course of the "Chicago" in that fashion.

(Testimony of Baldwin M. Woods.)

A. What is the third side of the triangle?

Q. The third side is the line of view of the observer.

A. If we picture an observer on the axis of the "Chicago" aft of the point of contact and observing the same point on the "Silver Palm", is that correct?

Q. That is right.

A. As the "Silver Palm" comes in, there were two angles of the triangle continually changing for an observer [511] aft the point of intersection of the course line.

Q. You would say he would see more of the starboard side of the "Silver Palm" as they came together?

A. Provided the "Chicago" were going astern.

Q. But only provided that the "Chicago" was going astern?

A. Or provided the "Silver Palm" was turning slightly to port.

Q. Or providing the "Chicago" bodily listed to the right, that is true, is it not?

A. Yes.

Q. In the use of your models no one gave you any data with respect to the vessels themselves other than their length and breadth and depth, did they?

A. And tonnage. I should perhaps say I saw pictures of them which would of themselves give considerable additional information as to the material used in their construction and the character of it.

(Testimony of Baldwin M. Woods.)

Q. I did not get definitely in my mind, Mr. Woods, for what purpose you used the rods that you used in the tests.

Miss PHILLIPS: Your Honor, I am going to object to that. The witness described that specifically and fully this morning. Counsel is now retracing what he has already covered on cross examination. The question has been asked and answered.

Mr. LILLICK: I have no recollection of his testimony with respect to the rod, other than there was a rod upon that test. I want that cleared up. That is the only point I have in mind at all.

The COURT: I think he said the only use of the rod was to keep the model from approaching, that the one who had the string could not control it. That was the only use.

A. That was the only use of the rod.

Mr. LILLICK: Q. And that the two models were held at the end of that rod until motion was actually started: Is that what you mean?

A. The rod was used for the "Chicago" and in most cases none was used for the "Silver Palm". The rod was used to hold [512] the Chicago out at a distance and also hold it until it was right straight in line.

Q. On a given course?

A. On a given course. No rod was in contact with it at the time of impact.

Q. You paid no attention whether one vessel or the other had a foul bottom, did you, in the model test?

(Testimony of Baldwin M. Woods.)

A. It was not necesasry, since the speeds were obtained without reference to foul bottom.

Q. And you think the turning result would have been the same, too, do you?

A. Yes.

Q. Can you tell me the interval of time that elapsed between the impact and until the two models that you were using came into the position shown on U. S. Exhibit 9-B?

A. I did not record the time. I should estimate it at a few seconds, on the order of one to three seconds.

Q. What did that mean in time in comparing your 1 to 150 of the difference between the models and the vessels themselves?

A. Off hand I could not answer that, I would have to compute it. The time ratios in tests of this sort are also a function of the model ratios and for the purpose of this test I did not compute them and do not recall.

Q. So that there may be no misunderstanding about it, Mr. Woods, you did not take into consideration, when that last diagram was prepared, that the engines of the "Chicago" were going astern and she backed away from the "Silver Palm"?

A. In conducting your experiments and recording the results, no account was taken, but numerous times in the discussion yesterday and today I have taken account of it in the allowance made.

Q. But you can not give me the time now that I asked you for, give the interval between the impact and when your models fell in that position?

(Testimony of Baldwin M. Woods.)

A. No. The important thing was not the time, but the fact that the results of the impact had been [513] approximately reached.

Q. On the models, without regard to engine action, and maneuvers of the two vessels when the collision occurred?

A. That is to say, the diagram as presented did not include such action.

Q. In your test did you give any consideration to the fact that from the time of the sighting of the "Silver Palm" it traveled 450 yards and the "Chicago" had traveled 250 yards to the point of collision?

Miss PHILLIPS: Just a moment; I object to that. In the first place, counsel is assuming two points there that I do not think have been proved, one of them possibly has, but certainly the other has not, that is to say, the "Silver Palm" had traveled that distance, and in the second place the amount which the vessel moved, the conditions are not included as part of the question.

The COURT: He has testified that the only thing he tried to prove was the angle of impact and the speed at that time.

Mr. LILLICK: The reason I asked that question is because the witness stated that he had handed to him a statement of the different officers, and they were a part of the background for the data from which he made the tests.

The COURT: I was thinking of what his own statements were of what he actually did, that he

(Testimony of Baldwin M. Woods.)

actually tried to duplicate the situation. He has several times in the record said it was not a matter of distance, it was a matter of bringing the two vessels together at the proper angle with the alleged speed.

Mr. LILLICK: I think that is true. We offer in evidence the statements furnished Mr. Woods by the United States District Attorney for his tests, and we also offer in evidence the two models as to which he has testified.

Miss PHILLIPS: I am going to object to the offer in evidence of the two models. The witness has testified that these models [514] are used by the University in its classes, and belong to the University of California. I think if counsel wants models introduced like this, he should have duplicates prepared at his own expense and put them in. He has not any right to take from people property and use it for that purpose. I have not the slightest objection to his having duplicates made, but I do not believe that he has a right to offer in evidence in this case the property of the university used by it. I have no doubt that the models could be borrowed, but I do not believe we have a right to take somebody else's property.

The COURT: What do you intend to do? Is it because you wish to use these is some test of your own, or is it because you simply want the court to see the models in connection with the testimony given?

(Testimony of Baldwin M. Woods.)

Mr. LILLICK: It was only that, in the event of an oral argument or in the event that we might need them here elsewhere, they might be subject to our being able to get them. I would have been glad to have interrupted Miss Phillips to say that I think we might perhaps have a right to insist upon their being put in evidence. I would neither wish to inconvenience the University by taking them away from it, and if Mr. Woods will be kind enough, if the occasion arises to say that we may use them if we wish to, for a day or two, and we may send for them, I will be quite satisfied with it.

The WITNESS: It will be a pleasure to do it.

The COURT: They will be available for the purposes of this case?

A. It happens that certain experiments are in progress by graduate students that call for their use when they are not urgently needed.

Q. But for the purpose of the argument or possible experiment for a brief period, they would be available for the use of the court? [515]

A. The first call would be to the court.

The COURT: I presume the only thing that is being offered, then, is the records which were used by the witness prior to making the experiments, and they will be marked Respondent's Exhibit No. 10 in evidence.

(The documents were marked "Respondent's Exhibit No. 10")

(Testimony of Baldwin M. Woods.)

Redirect Examination.

Miss PHILLIPS: I have a few questions, Professor Woods, counsel put this question to you yesterday afternoon and again made reference to it just a few minutes ago, that if the "Chicago" had been bodily coming over to the left, what would be the impression of one on the "Chicago" as to an apparent change of course by the "Silver Palm"? Does the position of the observer on the "Chicago" make any difference?

A. Yes, it does. The impression to one near the turning point of the ship would be quite different from the impression gained by one, let us say, considerably astern; in fact there would be a definite change in impression as one moves aft from the turning point.

Q. The expression "'Chicago' moving bodily over to the left", let us take the model. Which part of the "Chicago" is going to move bodily to the left if she is executing a right turn? I wish you would illustrate to his Honor.

A. On a left rudder, a turn to the left?

Q. A turn to the right. What rudder to the ship would move it bodily to the left, with the ship turning right?

A. When right rudder is applied to execute a turn to the right, the vessel may actually for a moment turn slowly to the port. The turning center follows almost the course which has been followed heretofore, describing a curve which gradually de-

(Testimony of Baldwin M. Woods.)

creasing turns to the right. The vessel itself swings about the turning center so that the after portion is out in this position, even [516] though the vessel is still moving; somewhat in that direction. It then gradually acquires momentum to turn, following the path.

Q. The bodily movement to the left then, occurs in what part of the ship?

A. The bodily movement to the left occurs aft of the turning center.

Q. Aft of the turning center?

A. Yes.

Q. Now if the "Chicago" was in fact moving ahead at a speed, let us say, in excess of two knots, even if she would turn to the right, could one on the "Chicago" forward of the pivoting point, but aft of the point of impact, could that person get an impression that the "Silver Palm" was turning left, or that she was not turning left?

Mr. LILLICK: I object to that as calling for the pure conclusion of the witness on a subject as to which the witness apparently has not any special knowledge.

The COURT: Do you feel that you are in a position to answer that question?

A. Yes.

Q. All right, proceed.

A. Would you repeat the question?

Miss PHILLIPS: What I am getting at is, if the "Chicago" were moving ahead at a speed in excess of two knots, turning right, would a person, say on the bridge of the "Chicago" forward of the pivoting point—could he get an impression that the

(Testimony of Baldwin M. Woods.)

“Silver Palm” was turning left even though she were not turning left?

Mr. LILLICK: I think that is pure opinion of the witness.

Miss PHILLIPS: Absolutely.

Mr. LILLICK: There is no foundation laid and I would like to have a foundation laid for it.

Miss PHILLIPS: It is absolutely opinion evidence. The witness has said that this is one of his particular fields of research. [517]

Mr. LILLICK: If your Honor please, this is a question of navigation, and what could be seen at sea by an observer.

The COURT: It is theoretically an optical illusion. Have you observed that situation and do you know?

A. Might I say in explanation, the apparent motion and direction in which the oncoming vessel “Silver Palm” would appear to be turning, depends upon whether the observer, considering him fixed on whatever station, the axis has not been stated—but whatever station he is on it depends whether the observer is seeing an increased portion of her left side or a smaller portion. If he sees a small portion he gets the impression that the other vessel, the “Silver Palm” is turning to starboard; if he sees an increasing portion he gets the impression of her turning to port. Under the conditions specified in the question, although I should have to verify them a little geometrically, it is my belief that the witness would not gain the impression that the “Silver Palm” was turning to port.

(Testimony of Baldwin M. Woods.)

Miss PHILLIPS: Q. My question was, unless she were in fact turning to port.

A. Unless she were in fact turning.

Q. Now I do not want to cover in detail too much of what counsel covered on cross examination, but I want to be sure that the results are before the court. You told counsel you were unable, with your models, to use a right rudder on the "Chicago" in the tests you made.

Mr. LILLICK: I object to your putting a leading question to the witness, and that is very leading.

Miss PHILLIPS: I have tried to sum up what the witness has said preparatory to asking another question.

Mr. LILLICK: Yet counsel is bound, I think, to ask questions that are not leading. [518]

The COURT: I think the question has been asked by you and he has answered it.

Miss PHILLIPS: I will withdraw it. What I am trying to get at is this. I thought I would shorten time on this. Why did you state to counsel that your inability to get the effect of a right rudder on the "Chicago" or her engines moving astern,—why did you say that was of no importance?

A. I said that was of no consequence in the test because of the relative magnitude of the thrust. The average blow, as I said this morning, the average strength of the blow delivered for a penetration of twenty feet, bringing the vessel from 10 knots to rest, is approximately six and one half million pounds; that blow being forward of the turning

(Testimony of Baldwin M. Woods.)

point exerts a moment about the turning point to turn the "Chicago" to starboard; the action of the four propellers with full power astern at 27,000 horse power available, amounts to a thrust of about 150,000, pounds, which acts along the axis of the vessel and produces no moment to turn. The flow of the water past the rudder is what actuates the rudder. That flow, with a speed of six knots forward and engines reversed, is materially diminished. Under the conditions, the thrust exerted by the rudder to turn the vessel materially would be diminished and would not be comparable to either of the other thrusts, it would be less than one per cent of the six and a half million pounds.

Q. Now, similarly, in your test of the "Chicago" from the stop position you said that you did not think that the fact that she was on a hard right rudder or that her engines were in fact started astern, that that made any difference. Why was that?

A. First that the thrust on the shaft reversing would in that case be even less than 150,000 pounds because of the reduced [519] efficiency of the propellers at zero speed, and in the next place the rudder would be quite ineffective.

Q. Is there any advantage, or is there a disadvantage in conducting the model tests, without having the "Silver Palm" model puncture the side of the "Chicago" model? Is that a disadvantage?

A. In fact there resulted an unexpected advantage when the "Chicago" had a forward speed, be-

(Testimony of Baldwin M. Woods.)

cause it was possible, since there was no penetration, to judge the extent of the side-swiping forces which were called into play by the impact.

Q. When the "Chicago" was put at rest, or in the test when she was moving astern, was there any advantage or disadvantage in the fact that you could not get your model to bite into the side of the "Chicago"?

A. In this case when it was at rest or going astern it made very little difference, since there was no disposition, there was no tendency to tangential motion, that is to say, slippage of the bow of the "Silver Palm" along the side of the "Chicago."

Q. Several questions were put to you by counsel regarding the action of the "Silver Palm's" engines full speed ahead at the moment of impact, or something of that sort, and I believe you said that they were of no consequence. Why was that?

A. If the power is applied to engines which have been idling, as we call it, or turning slowly, without power, in a ship in which the propeller is being revolved by the passage of water outside, being driven, so that the propeller in turn through the shaft is turning the engines, it is necessary for the engines to come up first to a speed which will give no thrust, and then continue to a speed which will give a forward thrust; that will require an appreciable time. If the speed of the oncoming vessel was ten knots, that is, if the speed were approximately ten knots, approximately 17 feet per second, if it were uniformly decel- [520] erated, it

(Testimony of Baldwin M. Woods.)

would require two seconds to penetrate to the extreme length. In the two seconds which I have mentioned it would not be probable and would probably be impossible for the engines just referred to, to come up to speed and to have acquired any strong thrust. In the next place, the thrust delivered to the propellers, even though the engines reached full power, would be of the order of 35,000 pounds, considering an efficiency of 50 per cent under the conditions mentioned. I am willing to concede that the efficiency might be ten points high. 35,000 pounds added to or even subtracted from the xi and a half million pounds, is in the fourth or fifth decimal place, and makes no difference.

Q. You have used several terms that I believe are laboratory terms. You have used the term "control variable." What did you mean by the term "control variable", and what were the control variables in this case?

A. In every experiment in any field of physics or mechanics one starts with certain variables which are assumed and which he attempts to control, as we say. In this case, the variables controlled were the speed of the two vessels, the angle between their courses and the point of impact.

Q. You have used the term "misfired" and valid results". I think those are laboratory terms and I wish you would explain those terms.

A. I used the term "misfired" perhaps loosely, to designate a test which gives no results. In other words, the control variables were not controlled. For

(Testimony of Baldwin M. Woods.)

example, in the model test, if one of the models failed entirely to strike the other, or if it struck at a position not the one assumed for the purpose of the test or at a different angle, then such tests was disregarded and their results were not considered nor recorded.

Q. I think that is clear now. Some mention has been made of [521] whether or not you knew about the thinness of the "Chicago's" plates or the type of construction of the "Silver Palm". I think you said something about that in your examination of the pictures. In your opinion did the construction of the two ships have anything to do with the result of your tests?

A. No. The construction of the two ships would have fundamentally a good deal to do with the precise character of the damage done at the point of impact. They would not have affected the dynamics of the case, that is to say, the character of the rotation of the vessel.

Q. You were asked whether or not you had in mind any wind effect existing at the time of the collision. Was or was there not any wind at the time you performed your tests?

A. There was no wind, that is to say there was a light air, under the definition which I gave, a movement of air not to exceed 50 feet a minute.

[522]

Q. Is that a desirable or an undesirable condition for a model test?

A. It is desirable for a model test of this character, unless one is attempting to measure the wave

(Testimony of Baldwin M. Woods.)

effect and has adequate equipment for it. The wave effects in this case were inconsiderable from the point of view of the models, and no wave effect was desired in the model test.

Q. You were asked a question whether you had in mind the absence or presence of wind at the time of the collision. What was your answer?

A. As far as the model tests were concerned, we did not take into account wind. In interpretation of the tests on any questions some account could be taken if knowledge is available of the direction and strength of the wind. For example, the resistance of a ship at a given speed, as I stated yesterday, is made up, roughly, of the resistance of the submerged portion, the resistance near the water line, due to wave motion, and the resistance of the superstructure in the wind. In many cases with relatively low wind and moderate speed the resistance of the superstructure to the wind is not a matter of great consequence.

Q. Would you consider a wind of approximately Force 3 from the north northwest a wind of consequence?

A. I am not familiar with that term. May I ask does that mean approximately 10 or 11 knots?

Q. Force 3 is Force 3 on the Beaufort Scale, I believe it is a wind of approximately 10 to 12 knots, or 9 to 12 knots.

A. That would increase the resistance of the vessel going against it and would aid it to stop in a slightly shorter distance than it would otherwise

(Testimony of Baldwin M. Woods.)

require to stop in case of full astern. It would not, from the point of view of these experiments, make any difference, as the important things were the vessel striking, [523] as I said before, at a right angle, the right point, and the right speed.

Q. You were asked some questions about these little things in the bottom of this model. Do you consider them of any importance?

A. In the model test?

Q. Yes.

A. No.

Q. Professor Woods, when you were instructed to perform these model tests, were you given any instructions as to the result to be obtained?

A. No. My instructions were to simulate certain conditions, namely, the conditions to which we have repeatedly referred, and to report whatever results were obtained. In other words, the test was to be a scientific test, and whatever results were obtained were to be recorded. I might say that in going over the cases which we have discussed I have not admitted any result which would give a different position from those given in the diagram submitted, where the initial control conditions were met.

Q. Did you have any preconceived idea of what the results would be before the performance of the model tests?

A. From my own computations and studies I had a general impression of reaching approximately these conclusions.

Mr. LILLICK: Might I interrupt? We are not

(Testimony of Baldwin M. Woods.)

interested in the impressions of the professor. We have the results of his experiments and what his impressions were is of no concern in this case, and I object to it on the ground that it is not within the issues.

Miss PHILLIPS: Q. My question was, at the commencement of the performance of the model test did you have any preconceived ideas of what results would be obtained? Does counsel say that is not entirely proper?

Mr. LILLICK: I still insist that question is objectionable [524] upon the ground that we are not interested in what Professor Woods' impressions were. We are interested in the results that he obtained.

Miss PHILLIPS: I think perhaps my question is badly worded. I withdraw it.

Q. Professor Woods, in performing the tests did you attempt in any way to control the results of the tests other than by fixing the control variables which you started with?

A. No.

Miss PHILLIPS: That is all.

Recross Examination.

Mr. LILLICK: Q. Professor Woods, to boil it down to one point, what I understand is the result of some of your testimony, in your opinion from the results obtained in your tests it would have made no difference in the results obtained had the models that you used permitted the "Silver Palm"

(Testimony of Baldwin M. Woods.)

to enter the "Chicago's" side and stay there during the time the "Chicago" was pushed over an arc of 50 degrees, with the engines operating on the two vessels?

A. I would like to have that question read.

The COURT: Read the question.

(Last question repeated by the reporter.)

Mr. LILLICK: Answer "Yes" or "No," and then explain.

A. If the answer of "Yes" means that it would have made no difference, my answer is "Yes." In the cases where the "Chicago" was at rest or moving astern, where there was no tendency to what I shall call tangential motion, longitudinal motion along the side of the vessel; in the case where the "Chicago" was moving forward the penetration would have modified the forces acting, and, as I said before, would tend to greater side-swiping.

Q. The answer, then, is Yes, it would have made no difference, with your explanation?

A. Yes, in the two cases I have mentioned.

Q. You explained the term "variable controls" in your tests as [525] being three factors, did you not, the control variables were three factors?

A. Yes.

Q. What were they?

A. The speeds of the two vessels, the point of contact, and the angle between the courses.

Q. And all of the balance of the elements involved in coming to a scientific conclusion with re-

(Testimony of Baldwin M. Woods.)

spect to your tests were outside of the field of variable control?

A. Yes. That includes all of the constants of the vessel.

Q. And in saying it includes all constants of the vessel, you did not take into consideration engine power?

A. I did not.

Q. You did not take into consideration rudder movement?

A. I did not.

Miss PHILLIPS: Your Honor, counsel is now beginning to go over the examination of yesterday afternoon.

The COURT: I think it has been asked and answered before.

Miss PHILLIPS: I object on the ground it has been asked and answered.

Mr. LILLICK: Very well.

Q. You gave us a figure of 150,000 pounds with relation to the striking impact. I am not sure about that, Professor Woods. Did you not use 150,000 pounds?

A. I said that the total pull on the shaft of the propellers retarding the ship and with full force astern with about 27,000 horsepower would be approximately 150,000 pounds.

Q. That is what I wanted to know. Professor Woods, if the "Chicago" had been in fact proceeding at a higher rate of speed than 6 knots the

(Testimony of Baldwin M. Woods.)

experiments or tests would have turned out differently, would they not?

A. I have covered the case that the "Chicago" moved up to a speed of 10 or 12 knots in earlier discussion, which would give results comparable, and which did in the tests give results comparable to those obtained with the forward speed [526] of six knots, only increasing the side-swiping tendency.

Q. And by the side-swiping tendency you mean contact and the two vessels going away from each other and not paralleling each other?

A. Yes.

The COURT: They are parallel, but their sterns are not in the same direction.

A. They are parallel but the prows are in opposite directions.

Mr. LILLICK: Q. Professor Woods, did you make a written report concerning the diagrams that you have given us?

A. No.

Q. And do I understand you that except for what you saw in the testimony of the gentlemen who were before the Naval Court of Inquiry, which we have here, and the testimony of the officers and crew of the "Silver Palm," you had no other data upon which to base this parallel result after the vessels did come to rest?

A. No data supplied for the purpose of this case, no.

Q. Except that you knew from all of these statements the vessels eventually landed, for one reason or another, in a parallel position?

(Testimony of Baldwin M. Woods.)

A. Yes.

Q. Have you the computation upon which you based the diagrams?

A. Yes.

Q. Are they in the form of notes?

A. They are my original notes made at the time of the experiments.

Q. Have you those with you, Mr. Woods?

A. Yes.

Q. May I look at them?

A. Yes.

Mr. LILLICK: That is all.

Miss PHILLIPS: That is all.

CARL J. VOGT,

Called for the United States, sworn.

Miss PHILLIPS: Q. Will you please give your full name?

A. Carl J. Vogt. [527]

Q. What is your occupation?

A. Assistant professor of mechanical engineering at the University of California.

Q. Will you please state your professional training?

A. I graduated from the University of California in 1926, and continued that engineering training at the University while I was working in the Research Department of the Standard Oil Company of California at Richmond. In 1928 I returned to the University and continued with engineering instruction, as well as taking courses at the same time.

(Testimony of Carl J. Vogt.)

Q. Did you assist Professor Baldwin M. Woods recently in conducting some model tests?

A. Yes.

Q. On what date?

A. On March 11.

Q. Prior to assisting him in these tests, did you perform any tests by yourself?

A. I did.

Q. Where?

A. At the University in the weir in the Hydraulic Laboratory.

Q. On what date?

A. That was on March 4.

Q. Professor Vogt, look now at Government's Exhibit 9-B, and having that in your hand, did you assist Professor Woods in performing any model tests in which the position of the ships represented in that diagram was the resultant condition of impact?

A. Yes, I did.

Q. Will you state what were the conditions under which that resultant condition is based.

A. When that vessel, here, that is, the larger of the two, initialed with the letter "c," representing the "Chicago" has a slight forward or slight reverse velocity over dead in the water—and by "slight velocity" I mean less than or approximately one knot.

Q. In performing the test resulting in the position of the vessel marked "C", what speed did you give the vessel which struck the vessel "C"?

(Testimony of Carl J. Vogt.)

A. Corresponding to 12 knots. [528]

Q. What angle of impact?

A. About 40 degrees.

Q. Professor Vogt, you have referred to having made previous tests to those on March 11 by yourself in the laboratory. Will you state whether or not in your laboratory test of March 4 you made any tests similar to the test represented in Government's Exhibit 9 and 9-B?

A. I did, and got the same result.

Q. And got the same result?

A. Yes.

Q. Why, then, did you repeat the tests a week later?

A. I performed the first series of tests, myself, which was rather difficult. The weir in which I made the test was rather small, and in order to get away from possible side effects, possible bottom effects on the model we repeated them in a larger body of water.

Q. You referred to other tests. Did you make any other tests giving the ship marked "S" a velocity of 12 knots striking at 40 degrees, and giving the ship marked "C" a speed different than stopped, slowing moving ahead, or slowly moving astern?

A. Yes, we did.

Q. What other speed?

A. One was a speed of approximately six knots ahead, and another one was we put it two or three knots astern, or four knots astern.

Q. When you gave the model marked "C" a

(Testimony of Carl J. Vogt.)

speed ahead of six knots and with the model "S" struck "C" at an angle of 40 degrees, "S" moving approximately at 12 knots, was the resultant position the same as that shown in Government's Exhibit 9-B?

A. It was not.

Q. When the ship marked "C" moved astern two, or three, or four knots and you with the ship marked "S" moving at 12 knots ahead struck at an angle of 40 degrees, was the position resulting from the impact similar to that shown in Exhibit 9-B?

A. No, it was not.

Q. In your model test experiment in the University Laboratory of [529] March 4, did you perform there a model test illustrating the speed of the "Chicago," "C", at 6 knots, and the vessel "S" at a speed of 12 knots striking at an angle of approximately four degrees?

A. I could not say that the vessel marked "C" had a speed of six knots, due to the fact that I was performing the test, myself, and I had to give it an initial velocity and then go to the other side of the weir and start the other vessel.

Q. What velocity would you estimate the model "C" had when struck by the model "S"?

A. It did have a forward velocity, possibly it was four or five knots, but I could not vouch for the fact that it was that value.

Q. Was the resultant position of this test per-

(Testimony of Carl J. Vogt.)

formed in the laboratory the same as the other position shown in Exhibit 9-B?

A. No, the only time that I got this position was when the model marked "C" was at rest.

Q. When the model "C" moved astern, did you have any model test in the laboratory in that situation, having the "Silver Palm" vessel "S" moving at 12 knots and striking at an angle of 40 degrees?

A. Yes, I did.

Q. Was the resultant position similar to that in 9-B?

A. Not when the vessel marked "C" was moving backward or in any other direction.

Q. You have already expressly limited moving slowly?

A. Yes, slowly.

Q. Did you have any instructions from the United States Attorney's office with respect to the experiments which you, yourself, should perform?

A. No, I did not.

Q. Have you ever met any member of the staff of the United States Attorney's office, to your knowledge, prior to to-day?

A. No, I have not.

Miss PHILLIPS: You may cross-examine. [530]

Cross Examination.

Mr. LILLICK: Q. Professor Vogt, how was it that you made these experiments on March 4, how did you happen to make them?

A. I was consulted by Professor Woods, and in

(Testimony of Carl J. Vogt.)

the discussion as to the forces that might be acting on these vessels at the time of impact, and to get a result indicated by figures that we had available, I wondered just as to what conclusion we would come from model tests, and I thought I would make those tests on my own initiative.

Q. That was before Professor Woods had made any tests, was it?

A. Yes.

Q. So that it was as a matter of fact an academic discussion between you?

A. Yes.

Q. Professor Vogt, in your opinion would the result obtained in the diagram Government's Exhibit 9-B have been attained if the models used by you had permitted the "Silver Palm" going at a speed of 12 knots an hour puncturing the model of the "Chicago" so that after puncturing her she would have been moving around over an arc of 50 degrees to the right before the vessels separated and then the engines of the "Chicago" kept in motion until she backed away to a parallel position? That is rather a long question and I think I will have it read back and have you follow it.

A. I think I have the point of the question, permit me to repeat it, whether we would have gotten the same position if the "Chicago" had her engines going in the reverse direction and had the model marked "S" punctured the model marked "C".

Q. And she had been swinging over, the "Chi-

(Testimony of Carl J. Vogt.)

icago" had been swinging over 50 degrees before the vessels parted.

Miss PHILLIPS: You mean swung around instead of swung over.

Mr. LILLICK: Swung around.

A. Yes, I believe we would have gotten the same result. [531]

Q. So that it would have made no difference, in your opinion, if the "Silver Palm" had stayed in contact with the "Chicago" over a period with the "Silver Palm's" engines going ahead until the "Chicago" and the "Silver Palm" together had arrived at the point where the "Chicago's" course had been changed 50 degrees to the right, and the "Chicago" had then backed off and stopped and they came to a position about parallel?

A. Well, that, of course, would depend on the length of time that the "Chicago's" engines had been going back, the condition of the water around the stern, as to what the propeller forces would have been, rate of propeller rotation.

Q. Would it not also be dependent upon the amount of backing power upon the "Chicago" and also the time during which she backed away?

A. Yes, it would, if you consider the time the "Chicago" could have gotten in any position she desired.

Q. Surely you do not mean that when the model "S", representing the "Silver Palm" hits the model representing the "Chicago," and eventually comes into a position parallel to the "Chicago," that the

(Testimony of Carl J. Vogt.)

same course would be described by those vessels where power had been applied to them?

A. Yes, I believe they would, considering the masses of the vessels and the power that might be applied during a brief period of time.

Q. What becomes of the time element involved in the period during which the two vessels are together and the "Chicago" moves over that arc of 50 degrees?

A. I do not believe I understand the question, the time element. Do you refer to the time during which the engines were in operation?

Q. Let me put it a different way. Professor Vogt, during the time in which the two models would be together, if your tests had involved the "Silver Palm" cutting into your model of the "Chicago," and pushed her or moved with her over an arc of 50 [532] degrees, how long a time, under your experiment, without the two vessels cutting into each other, did it take to have the "Chicago" swing over 50 degrees?

Miss PHILLIPS: I believe that question is unintelligible, and I object to it on that ground.

Mr. LILLICK: I will reframe it.

Q. Do you know what I mean?

A. I am afraid I cannot follow you.

Q. In the example I have given you I have assumed that the "Silver Palm," with her engines, was moving in contact with the "Chicago" and her bow in the side of the "Chicago" moved with the "Chicago" until the "Chicago's" course had been

(Testimony of Carl J. Vogt.)

changed 50 degrees. Now, there is a time element involved in that, and there is testimony in the case that that actually occurred. In the experiment that you performed, the model of the "Silver Palm" did not cut into the model of the "Chicago," did it?

A. No, it did not.

Q. Your model of the "Silver Palm" hit the model of the "Chicago" and made but one contact, that is right, is it not?

A. At times, sometimes due to the heeling of the "Chicago," it would come back and cause an impact on the "Silver Palm."

Q. Hit and rebound?

A. Rebound.

Q. And then moved away?

A. Yes.

Q. Did that occur only when the "Chicago" was going at an estimated speed of 6 knots an hour, or was it only when the model of the "Chicago" was at rest?

A. No, that was when the "Chicago" was going at an estimated speed of 6 knots, or when it was at rest.

Q. In other words, on both occasions it did that?

A. It did it several times, that is due to the heeling, it gave a reaction, a rebound.

Q. The time element that you used on the "Silver Palm" of 12 knots an hour was the time element that you used all through the experi- [533] ments, was it?

A. Yes, it was.

(Testimony of Carl J. Vogt.)

Q. So that you would be able to tell me relatively how long after the impact between the two models, when the "Chicago" was hit and hit again by the recoil, until the "Chicago" had turned over an arc of 50 degrees, would you not?

A. No, I do not believe I could tell you that, because we kept no record of the time of the coming back reaction.

Q. So that neither you nor Professor Woods paid any attention to the time after the impact on any one of your tests that resulted in the two vessels coming to a parallel position so that you would be able to tell me how long that took?

A. No, we took no time on that.

Q. Your two models came together and then you waited until they came to a rest in the water?

A. I would not say rest, that might be somewhat misleading, because models never come to a rest, but we waited until they came in that relative position to each other.

Q. Did they change from that position subsequently?

A. If they should be allowed to remain in that position for a period of time, say ten or fifteen minutes or maybe half an hour, they will spread apart or go in some other position.

Q. But we have been discussing when they came to a rest—you know what I mean, do you not—after the impact and the motion made thereby resulting in the two vessels coming to a rest in the water?

(Testimony of Carl J. Vogt.)

A. Yes, but if we allowed that to go on they would take another position in the water.

Q. The ultimate result was that in some of the tests they brought up in the position indicated by Government's Exhibit 9-B?

A. Yes.

Q. How many tests did you make that showed that?

A. Well, I could not definitely say how many, I would say approximately 15 or 20. There were, I am pretty sure, three or four that we ran in suc-
[534] cession that gave the same result.

Q. Do you mean that during fifteen or twenty tests altogether for different speeds?

A. Oh, no, we had many more than that. [535]

Q. Then you had 15 or 20 tests for the examples you have given with the "Chicago" running six knots an hour and the "Silver Palm" running 12 knots an hour?

A. No, pardon me, I was talking about this test which was with the "Chicago" dead in the water. With the "Chicago" going six knots there were probably three or four tests that we made at that speed or approximately that speed.

Q. What I would like you to tell me from that book is how many tests altogether you and Prof. Woods made with an indicated speed of 12 knots on the "Silver Palm" and an indicated speed of approximately six knots on the "Chicago"?

(Testimony of Carl J. Vogt.)

A. I could not give you the exact number on that but I would say that we probably made seven or eight tests.

Q. How many tests did you make with the "Chicago" at rest?

A. We must have made twelve or fifteen with the "Chicago" at rest.

Q. And out of the 12 or 15 that you made with the "Chicago" at rest, you used the constant of 12 knots for the "Silver Palm"?

A. Yes.

Q. Out of the 12 or 14 tests that you made, how many resulted in the vessels coming to the position indicated by Government's Exhibit 9-B?

A. They all resulted in that position.

Q. They all resulted in that position?

A. When the point of impact was at the same point, about three-quarters of the way forward and the angle of 40 degrees or 45 degrees.

Q. So that you had 12 or 14 completed tests with the "Silver Palm" running at 12 knots and the "Chicago" approximately at rest, which resulted in the diagram shown on Government's Exhibit 9-B?

A. Yes.

Q. You made no test whatever with the two models at that speed that did not result in that same position when they came to rest?

A. To the best of my knowledge, no.

Q. During these 12 or 14 tests at that speed, did your models all strike at that same approximate point on the "Chicago's" port [536] bow?

(Testimony of Carl J. Vogt.)

A. Yes, the same point and at the same angle.

Q. In making these tests did you always handle the model for the "Chicago" or the model for the "Silver Palm"?

A. The model for the "Silver Palm" except when I made them by myself a week prior to this.

Q. What I have been asking about has been about the tests made by you with Prof. Woods.

Miss PHILLIPS: I did not so understand the witness, because I think he has covered both.

Mr. LILLICK: I will ask him to be sure. It is my understanding, Professor Vogt, that the answers you have been giving me about the tests have referred to tests that were made by you with Prof. Woods?

A. Yes.

Q. And you say, during those 12 or 14 tests, which model did Prof. Woods handle?

A. He handled the one that represented the "Chicago".

Q. How did you make the tests; just tell me exactly what you did and exactly what Prof. Woods did.

A. We took the models to the University swimming pool, located in Strawberry Canyon in Berkeley, where we had ample room. The first thing I shoved the model representing the "Silver Palm" about 25 or 30 feet out in the pool, while Prof. Woods towed or put in position the model representing the "Chicago" about four or five feet from

(Testimony of Carl J. Vogt.)

the edge of the pool, and then when we figured that the model representing the "Chicago" was at rest I would tow the model representing the "Silver Palm" or give it an initial impulse which would correspond to a speed of about 11 or 12 knots at the time of impact, so that the "Silver Palm" would strike the "Chicago" at about three-quarters of the way from the stern, or one-quarter away from the bow, and in order to determine its initial velocity of 11 or 12 knots, we made several runs along a straight section of the pool which [537] was measured off, and took our time on that, and then with the same tension on the string, we could check quite closely as to what the velocity was.

Q. How deep was the water, Prof. Vogt?

A. At least ten feet.

Q. How did you get the model of the "Silver Palm" 25 feet out into the pool?

A. Just gave it a shove until it reached the end of the string.

Q. And let it run out to the end of the string you had on it?

A. Yes.

Q. After it reached the end of the string, 25 feet from you, how did you fix its course when you pulled it in?

A. Before it reached the end of the string I put a slight tension on the string so that it would not start to come back, so that it came to a rest at that point, and then I directed the string over the

(Testimony of Carl J. Vogt.)

portion of the bow where I intended to have the model struck, and kept the string in that position while I was giving it this impulse, and then after the model came up to speed, I allowed the string to become slack so that there was no further impulse given to the model.

Q. When you gave it that impulse, Prof. Vogt, did you do it by hand without stepping back?

A. Yes, I did.

Mr. LILLICK: It is now 4 o'clock and I have quite a little more examination of the witness.

Miss PHILLIPS: I would like to go on and finish with the witness. I had an assurance that if the witness was on the stand at 4 o'clock, his examination could go on and be completed.

The COURT: I have taken Mr. Lillick's statement as to the length of the examination he is going to have.

Miss PHILLIPS: I think counsel could complete it if he went on.

Mr. LILLICK: I could not complete before 5 o'clock.

The COURT: We will take an adjournment now until tomorrow morning at 10 o'clock.

(An adjournment was taken until March 23, 1934 at 10 o'clock)

Filed June 19, 1934. [538]

(Testimony of Carl J. Vogt.)

Friday, March 23, 1934.

CARL J. VOGT,

Cross-examination (resumed).

Mr. LILLICK: Miss Phillips, we desire to offer in evidence the notes which Mr. Woods said he had made.

Miss PHILLIPS: I object to that, your Honor, as being unintelligible without the witness' explanation. He testified that he performed many experiments with variation of speed, and I think this in and of itself would not assist the Court.

The COURT: I think it would be better to bring him back, because he handed the book to you, didn't he?

Mr. LILLICK: He did not designate any pages. I asked him whether he had these notes with him, and he said yes, and produced them and handed them over to me, and I want to offer them in evidence. I can call attention in the record to what I asked him for.

Miss PHILLIPS: I think your Honor would get a great deal more out of this data if the witness were to explain them. He testified to variations of the speed.

The COURT: As I understand, the whole book is being offered is it not?

Mr. LILLICK: These are the notes that I called for.

The COURT: Let me understand what you are

(Testimony of Carl J. Vogt.)

offering. Are you offering the book in evidence, or just the two pages?

Mr. LILLICK: That is what was given us as the notes he had made. I asked him for his notes at the time of the experiments and he handed me this.

The COURT: The only question is as to the value of them to the Court, because if the court has not any information as to what he put down here it would be meaningless. [539]

Miss PHILLIPS: I will withdraw my objection, your Honor.

The COURT: If there is no objection it may be received as Respondent's Exhibit 11, the two sheets.

(The two sheets of notes of Baldwin M. Woods were marked "Respondent's Exhibit 11".)

Mr. LILLICK: Professor Vogt, in making your tests with Professors Woods, and hereafter unless I specifically refer to the tests you mentioned as having been made prior by you on March 4th, I mean the tests made at the swimming pool by both of you—when you started your model of the "Silver Palm" at 25 feet distance from the model of the "Chicago" what distance had you in mind as between the two vessels, themselves, at sea?

A. At the time I started the "Silver Palm" there was a distance of about 20 feet between the model of the "Silver Palm" and the model of the "Chicago."

Q. My question is, what distance had you in

(Testimony of Carl J. Vogt.)

mind as a comparable distance that the two vessels were apart when at sea?

A. We did not figure on the distance between the two vessels at sea. In a model test we were only interested in where they are at the instant of impact.

Q. So that the relative size of the models of 1 to 150 at no time in your test were assumed as having any bearing upon the actual conditions that surrounded the two vessels before the collision at sea?

A. None, whatsoever.

Q. Yet, I understand you computed the speed of your model of the "Silver Palm" at 20 feet away as having a velocity of 12 knots?

A. No, the velocity of impact, we tried to get the velocity at the instant of impact as 11 knots.

Q. Then I must have misunderstood some of the testimony. It is your understanding that what you were seeking to attain from your tests was a velocity at the moment of impact?

A. Yes. [540]

Q. Of 12 knots, by the model you used of the "Silver Palm"?

A. Yes.

Q. And correspondingly with the "Chicago" on your various tests a speed upon her part varying from one knot astern to two knots forward, and in other tests with a speed upon the part of the "Chicago" of approximately 6 knots ahead when the vessels actually came in contact?

A. Yes, we were only interested with the instant of impact.

(Testimony of Carl J. Vogt.)

Q. And yet all of that was based upon models 150 times smaller than the vessels?

Miss PHILLIPS: May I have the question read?

The COURT: Read the question.

(Question repeated by the reporter.)

A. Yes.

Mr. LILLICK: Q. Did you perform any tests with an assumed speed of 10 knots on the part of the model which you used for the "Silver Palm"?

A. A speed of 10 knots?

Q. Yes.

A. Not that I recall. We tried to maintain the speed at 11 knots, which would give us—

Miss PHILLIPS: Will you speak up so that we can hear you? It is very hard to hear you.

A. (Continuing) We tried to keep the speed at approximately 11 knots with, say, an accuracy of plus or minus of that, 10 per cent. of that speed either way.

Mr. LILLICK: Q. Then you did not try to keep the model of the "Silver Palm" that you used at a velocity of 12 knots at the time of the impact?

A. Yes, I think we tried it at 12 knots, but that was our mean speed, allowing for an error of 10 per cent. on either side of it, so it would be between 10.8 and 13.2 knots. That would be about the limit of our accuracy.

Q. Then when you stated just a moment ago that you had been informed that the test was to be made

(Testimony of Carl J. Vogt.)

at a speed of 11 knots, your pre- [541] vious answer that your tests were made with a speed of 12 knots at the time of impact is not in accordance with what you really did?

A. Well, all I can answer to that is that within the limits of accuracy our speed was somewhere between 10.8 and 13.2 knots. That is, I cannot say definitely that it was 11 knots at the instant of impact, or that it was twelve knots.

Q. What, in difference in time, was your computation based upon with respect to the feet per second that the model was to go?

A. I would have to figure that. One knot is equivalent to 1.7 feet per second, and we based our calculation on that.

Q. Then, basing the calculation upon that, what is the difference using 1.7 feet per second in the distance covered by your model when it was striking the "Chicago" at a rate of speed of 10.8 in comparison with the striking of the "Chicago" at a speed of 13 plus?

A. Will you repeat that?

The COURT: Read the question.

(Last question repeated by the reporter.)

A. The speeds of impact would be in the ratio of 10 to 13.

Q. Give me that ratio in 1.7 feet.

Miss PHILLIPS: Your Honor, might I suggest that arithmetical calculations like that need not be done in court.

(Testimony of Carl J. Vogt.)

The COURT: If the witness does not feel that he can answer that from the stand, otherwise he can compute it. If he wants a pencil and paper to use that is his privilege.

Miss PHILLIPS: It seems to me counsel is putting the witness through a test in mental arithmetic, and I think if the witness states the principle it is not necessary for counsel to have the multiplications, additions, and subtractions put down in Court. If the witness states the principle it is unnecessary to protract the examination and take so much of the time of the Court about it. I think that is simply a matter of arithmetic. [542]

Mr. LILLICK: In reply to Miss Phillips' suggestion, I am not asking the witness the question for the purpose of putting him through an examination with respect to mental arithmetic. What I want to know is the difference in feet that the model of the "Silver Palm" traveled, the assumption being that she traveled 1.7 feet per second, going at the rate of 10.8 knots at the time of the impact on one occasion, and upon the other 13 plus at the time of the impact. It is not mental arithmetic. It is a desire on my part to find out what actually occurred with respect to these models.

The COURT: In other words, what you desire to know is, as I understand, at these various speeds how many feet actually a second this miniature vessel went?

Mr. LILLICK: Exactly. Do you wish a sheet of paper to do that?

(Testimony of Carl J. Vogt.)

A. I think that we have a misunderstanding here. What I meant by 1.7 was the feet per second was that was equivalent to 1 knot per hour; if she was making ten knots per hour it would be ten times that, or 17 feet per second.

Q. So, as a matter of fact, the computations are based upon a speed of one knot per hour, being 1.7 feet per second?

A. Yes.

Q. How did you regulate the speed of the model you used for the speed of the "Silver Palm" at the moment of impact when the initial pull put upon the model 20 feet away was the only pull exerted upon the model?

A. We did not try to alter the conditions of motion of the "Silver Palm" after we had once given it the initial impulse; in other words, we would assume, then, when the "Silver Palm" was making 12 knots per hour she shut off the engines and coasted.

Q. But I understood you a few moments ago, Professor Vogt, to say your computation was based upon a velocity at the moment of impact of a 10 per cent. difference in speed at that time of 12 [543] knots per hour. That is right, is it not?

A. Yes.

Q. Now, I understand that you attained the initial velocity upon the model of the "Silver Palm" by pulling upon it with a string at a distance of 20 feet away from the model of the "Chicago." That is right, is it not?

(Testimony of Carl J. Vogt.)

A. Yes.

Q. After you gave it the initial pull the string was dropped in the water and the model of the "Silver Palm" approached the "Chicago" and finally hit it?

A. Yes.

Q. Your results were not always the same, were they, with respect to the striking of the two models together when you started the model of the "Silver Palm" 20 feet away from the "Chicago"?

A. No, the point of impact was not always the same. Sometimes we missed entirely.

Q. Some times the two vessels would miss entirely?

A. Yes.

Q. Would your model of the "Silver Palm" yaw in the water?

A. I think we could say that it did under the conditions when the tests were made when the "Chicago" had a forward velocity.

Q. But you could make it strike the "Chicago" when the "Chicago" model was at rest?

A. I do not think we ever missed in that case, although the point of impact varied slightly from one point to another.

Q. Now, you have given me the distance between the model of the "Chicago" and the model of the "Silver Palm." What was the distance from your hand to the portion on the model of the "Silver Palm" to which the string was attached?

A. I should assume 25 or 30 feet.

(Testimony of Carl J. Vogt.)

Q. 25 or 30 feet?

A. Yes.

Q. Did you use anything while the model of the "Silver Palm" was coming toward you to keep it in a straight line?

A. No.

Q. Would it have been possible for you to have had these two models strike one another had the model of the "Silver Palm" been, [544] while it was coming toward you, changing over a course of 10 degrees to her right?

A. Well, in a model test we would not take that into account. We are interested in the condition at the instant of impact. We would take that as the position that she would have at the time of impact on a straight course.

Q. Regardless of whether prior to impact, and at the time of the impact, and thereafter, the "Chicago" was on a hard a-starboard or hard right rudder, you paid no attention to that?

A. No, we did not.

Q. Had you been informed that after the collision the "Silver Palm's" course was changed to left 165 degrees?

A. No, I do not believe I had been, not to the best of my knowledge.

Q. Is it your opinion from what you knew of the "Silver Palm" and "Chicago," with the "Chicago" proceeding at 6 knots an hour at the time of the impact, and the "Silver Palm" proceeding at a

(Testimony of Carl J. Vogt.)

speed of 10 knots an hour, that the stem of the "Silver Palm" would not have punctured the side of the "Chicago"?

A. Do I believe that it would not have punctured the side of the "Chicago" under those conditions?

Q. Yes.

A. Yes, it probably would have punctured the side, but I believe the "Silver Palm" would have had her bow sheared or badly crushed.

Q. At 6 knots an hour, on the part of the "Chicago", and at 12 knots an hour upon the part of the "Silver Palm," by Government's Exhibit No. 10, you would say that the "Silver Palm" and the "Chicago" would have gone by each other in opposite directions, is that your testimony?

A. No.

Q. Let us assume, then, with this diagram, Government's Exhibit No. 10, a diagram covering your tests, that the model of the "Chicago" is going at 6 knots ahead and the "Silver Palm" at 12 knots ahead, what, in your opinion, would have been the result [545] had the "Silver Palm" struck the "Chicago", with your knowledge of the construction of the vessels, and not your models, when the "Silver Palm" struck her at an angle of 40 degrees? Which way would the two vessels have gone?

A. They would have ended up in that position, I believe, but the bow of the "Silver Palm" would have been sheared off.

(Testimony of Carl J. Vogt.)

Q. But they would have ended in the position indicated in Government's Exhibit 10?

A. Yes, in that relative position.

Q. Am I stating it correctly, then, that the two vessels would, after the collision, have been in a position parallel to one another, each pointing in an opposite direction?

A. Yes

Q. Which you term "sideswiping"?

A. Yes, that is at the instant of impact the "Chicago" heeled, and then on the rebound an impact came at another point, which showed that the "Chicago" had moved ahead and the "Silver Palm" had side-swiped it.

Q. With your models both of solid wood and neither having any break?

A. How do you mean?

Q. My question is, your models were both solid wood and neither the stem of the model of the "Silver Palm" was smashed in, nor the side of the model of the "Chicago" not cut into, they were solid pieces of wood?

A. Yes.

Q. They hit and then that side-swiping occurred?

A. Yes.

Q. You know nothing about the heaviness or lightness of the shell plating on the "Chicago," do you?

A. No, I am not familiar with it.

Q. You know nothing about the strength or heaviness of the bow of the "Silver Palm," do you?

A. No.

(Testimony of Carl J. Vogt.)

Q. Have you ever had any experience in navigation, Professor Vogt?

A. Yes.

Q. Where?

A. In the United States Navy; I hold a commission in the Reserve.

Q. As what?

A. As engineer officer. I have had about 22 weeks [546] sea duty in the last seven years.

Q. Then you do know something about the plates on the cruiser "Chicago," do you not?

A. I don't know what the weight of the plates are in that section.

Q. Do you not know that she is a very lightly-constructed vessel?

A. Well, I know that she was light in that forepart, that there was no armor plate in that region, but I don't know the dimensions of the plating.

Q. In your experience in the Navy you have had opportunities, have you not, particularly in the engine-room department, to learn something about the construction of merchant vessels?

A. Yes.

Q. You know, do you not, that a merchant ship of the type of the "Silver Palm" has a very structure in the bow?

A. Yes.

Q. With a very heavily built up forepeak tank with cross girders?

A. Yes.

(Testimony of Carl J. Vogt.)

Q. Frames and ribs?

A. Yes.

Q. An exceedingly strong type of construction, is it not?

A. Yes.

Q. From that knowledge, can you tell me whether, in your opinion, these two vessels when they came together the result was not that the "Silver Palm" did break into the side of the "Chicago"?

A. Was the question that the result was that the "Silver Palm" did break into the side of the "Chicago"?

Q. Yes.

A. Yes, sure.

Q. Do you still believe that if the "Chicago" had been going ahead at 6 knots an hour and she had come into contact with the "Silver Palm" running at 12 knots an hour, that the "Silver Palm" would have side-swiped, as you put it, the "Chicago", and ended after the collision in a position with the two ships practically parallel, each facing in the opposite direction?

A. Yes, I still [547] do.

Q. Did you ever know a steel vessel that has been in a collision to cause the damage that you saw on the "Chicago"?

A. No. I did not see the damage on the "Chicago," merely a photograph of it.

(Testimony of Carl J. Vogt.)

Q. In fact, you have never seen either one of those vessels?

A. No.

Q. I further understand you have never seen the result of a collision between two steel vessels?

A. I recall one vessel that was at a dock on the Embarcadero in San Francisco several years ago that did have the bow stove in, I do not recall what happened, or anything about it.

Q. You don't know the name of the vessel?

A. No, I just remember having seen it.

Q. How long ago was that?

A. I would estimate five years.

Q. Do you remember whether you were informed prior to the tests that the "Chicago" turned in an arc of 50 degrees during all of which time the "Silver Palm" was in contact with her?

A. No, I do not recall that I was informed of that.

Q. Now, a few further questions, Professor Vogt: First, how many tests did you make with the "Chicago" at rest, as you remember?

A. I do not recall, I would estimate probably twenty.

Q. How many tests did you make with the "Chicago" going forward at a speed of 6 knots?

A. Probably less than that, ten or twelve.

Q. How many did you make with the "Chicago" going astern four knots or less?

A. About the same as the ahead, 10 or 12. I am only assuming there the tests that were completed.

(Testimony of Carl J. Vogt.)

not counting any misses or any tests where it struck the stern or amidships.

Q. You made many other tests that were unsatisfactory?

A. Yes, that were unsatisfactory.

Q. In other words, if you did not bring out the results that you wished—

A. (Interrupting) We did not wish any result. All we [548] were after was whether we could repeat this and bring the models to the same position when they came at rest, and we did not make up our mind that we desired certain results, but worked for those results.

Q. Now—

Miss PHILLIPS: Just a minute, let him finish.

Mr. LILLICK: Q. Had you finished?

A. Yes.

Q. All tests that did not eventually bring the two vessels at rest in a position parallel to each other you discarded?

A. Oh, no, we recorded everything, that is all the tests that we made where the impact was about three-quarters of the way forward and a quarter of the way aft, and when the impact was at an angle of approximately 45 degrees, we recorded all of those tests, and if the initial conditions were the same we got the same final results.

Q. Then, to put it so I will understand it, you discarded all tests where you were unable to make the model of the "Silver Palm" strike the model of

(Testimony of Carl J. Vogt.)

the "Chicago" at approximately the position indicated by the exhibit in court where the black mark is?

A. Yes, we did not record those tests.

Q. Had you read the testimony of the officers and crew of the "Silver Palm" before you made your tests?

A. No, I have seen no testimony.

Q. You read none of the statements of the officers and crew of the "Chicago" before the Court of Inquiry?

A. No, I have seen none of it.

Q. In your opinion, would the result of your tests have been different had the models used by you had rudders and two propellers on the "Silver Palm" model, and four propellers on the "Chicago" model?

A. No, I do not believe they would be. I believe they would be the same.

Q. In your opinion these tests would have resulted the same, even [549] had the "Silver Palm" had two propellers, both in forward motion and the "Silver Palm" turning over a course of 10 degrees to the right and the "Chicago" backing full speed with four propellers on a hard right rudder? You think these tests would have resulted the same?

A. I am sure they would. Although the statement in the question would make the problem appear complicated it is not, because we have two forces acting or having a reverse force on the ship,

(Testimony of Carl J. Vogt.)

and the other ship is moving forward, and so we have those two opposing forces, one that is larger than the other, so we can add those two forces and resolve them into one force.

Q. Regardless of rudder?

A. Regardless of rudders.

Q. Regardless of the action the propellers resulted in upon the forward or astern motion of the two vessels immediately after the impact?

A. Yes, because the propellers, the thrust from the propellers is acting along the center line of the ship, the momentum of the ship is along the center line, and so we can add those two forces and resolve them into one single force which was acting in the direction of the vessel.

Q. In your opinion those forces would not have any effect upon the eventual position in which the two vessels came to rest?

A. No. Is it permissible to refer to some calculations that I made on that, so that I can give you the value?

Q. Certainly.

A. I made up a calculation of the kinetic energy of the two ships at the different speeds. Assuming that the "Chicago" was going 6 knots ahead, the kinetic energy at six knots, from this data, came out about forty million foot pounds, and a ship of that size, making 6 knots, and from experience, I have shown that she would stop, if she got an emergency full astern bell, in a distance of 250 feet, and that means that the kinetic energy, which is forty

(Testimony of Carl J. Vogt.)

million feet, divided by the 250 [550] feet stop means that that would be 160,000 pounds thrust of the propellers, which, with the "Silver Palm" making 10 knots, delivering a blow of 6,500,000 pounds, so it would be 6,500,000 into 160,000, which is even less than 2 per cent.

Q. Then, in your opinion, after this mathematical computation, it would have made no difference if the captain of the "Chicago" had, after the collision, maneuvered his vessel and directed her course around so that she took a position through maneuvering and independent action after the collision—

Miss PHILLIPS: Just a moment now: Counsel is going into a subject that is—

Mr. LILLICK: I beg your pardon.

Miss PHILLIPS: I think you ought to make your question a little more definite.

Mr. LILLICK: I will make it more definite.

Q. Professor Vogt, Captain Kays, who was the captain on the "Chicago," testified as follows:

"The vessel, which I found out afterwards was the 'Silver Palm', recoiled as she struck, the 'Chicago' heeled heavily to starboard, and I got the mental impression that she was swinging to the right. The 'Chicago', as she came back, rolled back to port, nearly touched the 'Silver Palm' again, and I think it was about the time she struck that I ordered one-third slow engine, and then I continued to back so that she would back away from her, and we pulled away a short distance and then stopped,

(Testimony of Carl J. Vogt.)

the 'Silver Palm' lying then more or less parallel to us some distance away."

Bearing in mind that the Captain of the "Chicago" so testified, would you still say that the action of the engine so indicated and the maneuvers made by the "Chicago" would not alter the situation that you have figured out and shown on diagram Exhibit 10? [551]

A. I think you mean Exhibit 9.

Q. Thank you, Government's Exhibit 9-B. Yes or No, please, and then explain your answer.

A. I am afraid I could not answer it "Yes" or "No."

The COURT: Answer it the best you can.

A. Might I explain, from the testimony I assume that she was backing straight up, that is, straight back, the engines were turning over one-third astern, the propellers were reversing one-third. That would mean that their relative positions at the time of impact would have been the same as we have shown, but the "Chicago" would have moved back in the line of direction as we have indicated on these charts.

Mr. LILLICK: Q. Then what do you do with the remainder of, as indicated by Captain Kays: "I continued to back so that she would back away from her, and we pulled away a short distance." Surely, you do not mean that would accord with the ultimate result shown by you in Government's Exhibit 9-B?

(Testimony of Carl J. Vogt.)

A. I might see that exhibit I think I could explain to you what I have in mind.

A. With the "Chicago" going one-third astern, her position would come along this center line, she would have been displaced backward, which means that their two lines would be directly on the same course and her bow would have been pointing this way. That is the only change that I believe would have been made.

Q. Notwithstanding the captain's testimony that thereafter he continued to back so that she would back away from her and we pulled away a short distance and the stopped?

A. Of course, pulled away would be moved away, would it not?

Q. So that your assumption is that the captain meant that the vessel moved away, and that means pulled away?

Miss PHILLIPS: That is rather argumentative. The witness [552] has answered the question several times.

Mr. LILLICK: May I have the question read?

The COURT: Read the question.

(Question repeated by the reporter.)

A. I don't know just how he interpreted pulling away, but I certainly do not believe that he meant that the "Silver Palm" was embedded in the "Chicago" and that he gave orders to reverse the engine and that he pulled away; that would mean that there was a moment on the "Silver Palm" which

(Testimony of Carl J. Vogt.)

would swing her around in the other direction and she did not keep her bow in there, as I understand.

Mr. LILLICK: Q. As a matter of fact, you don't know what they did on the "Chicago" and the "Silver Palm," do you?

A. No.

Q. You would not have us believe, Professor Vogt, that your diagram here indicates for a certainty what happened to these two vessels, do you?

A. No, this merely shows that we dissipated a certain amount of energy, and that would be the result that would be had when the energy was dissipated.

Q. Isn't it a fact that the purpose of your experiments was alone to determine the amount of kinetic energy involved in the blow between the two vessels?

A. No. We could calculate the amount of kinetic energy which is dissipated easier than we could by the method this way.

Q. But that was what you performed the experiment for, was it not?

A. No. We performed the experiment to determine just what the action of the vessel was at the time of the impact, and checked them up with the photographs that we had available.

Q. Isn't it a fact that in performing these tests you disregarded the element involved in changes of course made by rudder, changes of course made by

(Testimony of Carl J. Vogt.)

propeller, and changes that were ordered made on [553] the two vessels by the respective captains after the impact?

A. No.

Q. You did not?

A. No.

Q. How do you know what the captains were doing?

A. We had information as to what the position of the two vessels was at impact. Now, no matter how many forces were added at the instant of impact, we could resolve all of those forces into one force on each vessel.

Q. Let me ask the question again: Have you not, in coming to the conclusion which you reached, entirely disregarded the possible effect of rudders on both vessels, engine operation on both vessels, and what the respective captains did after the accident? Answer the question "Yes" or "No," and then explain.

Miss PHILLIPS: Counsel has asked the question several times and the witness has explained it. The trouble is, counsel cannot understand the witness' answer.

Mr. LILLICK: I think I am entitled to an answer.

The COURT: For the purpose of your determination on these models, did you consider those things?

(Testimony of Carl J. Vogt.)

A. The way the question is asked the only way I can answer is to say Yes and No, because there are two questions.

Mr. LILLICK: Q. Yet you told me——

Miss PHILLIPS: Let him explain.

The COURT: Let him answer to what extent it is Yes and to what extent No.

A. As to the first part, as to the action of the rudder and the propellers, I will say we considered them. As to the maneuver of the vessels after the collision, we disregarded them.

Q. Let me ask you, was that because up to the moment that you might say they reached this position, which is represented by this model, that they had an effect, in your opinion, of sufficient moment in the problem to affect this result, but of course after [554] this result is over and the forces had come to an end, then the maneuvering of the vessels would not have affected the result: Is that what your answer means?

A. Yes, that is up to this point, if there was any change of the course it still applies along the center line of the axis, that is, the energy still applies along the center axis of the ship and that is resolved into one force, and, therefore, if there is any force due to the propellers or rudder we could add those forces and properly add them or subtract them from the forward momentum.

Mr. LILLICK: But without a knowledge of the maneuvers thereafter you could do anything with that, could you?

(Testimony of Carl J. Vogt.)

A. Not with that model test. I don't know whether they would mean anything as far as the maneuvering goes after that.

Mr. LILLICK: Might I speak to you off the record, Miss Phillips?

Miss PHILLIPS: No, I would like to have it on the record.

Mr. LILLICK: It is regarding what we are to do this afternoon. I have one witness who will be available at two o'clock. Have you other witnesses now?

Miss PHILLIPS: Yes, I have one other witness. I am prepared to go on and finish my case quite promptly, and then counsel can start in and put in his case. I will say that my case can be completed by a quarter past eleven, that is, my case in chief upon the navigational issues presented by the Government's libel against the "Silver Palm" and the cross libel presented by the Silver Line, Limited.

Mr. LILLICK: So that it will be all right for me to have a witness here at two o'clock?

The COURT: The other cases will not be taken up except by deposition?

Miss PHILLIPS: The second case, your Honor, is the Petition [555] of the Silver Line, Limited for Limitation of Liability. That is a separate case. My case in chief upon the navigational issues in chief can be completed within twenty minutes. The cargo owners case is one which does not involve the navigational issues, and I believe all the cargo

(Testimony of Carl J. Vogt.)

owner would have to do would be to put in proof as to the ownership, which could be done at any time. It could be done before the Commissioner.

Mr. SAWYER: As far as the cargo owners are concerned, we take the position that both vessels are to blame, and as far as the proof of our case is concerned that is something that can be done at the convenience of the Court. It is purely formal proof, and we will be ready to put in that formal proof at any time that is convenient.

The COURT: You could arrange to have that taken before the Commissioner.

Miss PHILLIPS: I am ready to go ahead now. Have you any more questions of this witness?

Mr. LILLICK: Yes.

Q. Prior to making your tests with Professor Woods with whom did you discuss the facts of the collision?

A. With Professor Woods.

Q. Was one of the results which you were to obtain by the tests you made to find out whether the models after the impact would parallel one another?

A. No, that was just the result that came through the test. We were more interested in what we could determine from the action of the forces.

Q. In other words, your test originally was intended to cover only the development of how much kinetic energy was involved in the impact?

A. No, I would not say how much kinetic energy was involved, because I have calculated that, but

(Testimony of Carl J. Vogt.)

particularly to see the direction of the action of the forces, and to see if there was side- [556] swiping which would tend to cause the buckling of the bow of the "Silver Palm" as claimed.

Mr. LILLICK: That is all.

Miss PHILLIPS: That is all.

ROBERT K. McDONNELL,

Recalled for the United States.

Miss PHILLIPS: Might I offer in evidence as Government's Exhibit next in order the diagram showing the kinetic energy versus speed of the "Silver Palm" and "Chicago", which I think was referred to by Mr. Woods yesterday and the witness to-day.

The COURT: It will be received in evidence as U. S. Exhibit 12.

(The diagram was marked "U. S. Exhibit 12.")

Q. Mr. McDonell, have you examined the prints of the "Chicago" showing the plates injured in the collision?

A. I have.

Q. Did you make a diagram showing the plates injured and the dimensions of the plates at various points of collision?

A. I have it here in my hand.

Q. Does this diagram show the thickness of plates at each point?

(Testimony of Robert K. McDonnell.)

A. It does. I can say that every thing shown on that diagram was either in contact or damaged in the collision.

Miss PHILLIPS: I will offer this in evidence as Government's Exhibit next in order.

Mr. LILLICK: No objection.

The COURT: It will be received as U. S. Exhibit 13.

(The plan is marked "U. S. Exhibit 13.")

Miss PHILLIPS: That is all.

Mr. LILLICK: No questions.

Miss PHILLIPS: I will now offer in evidence the deposition [557] of William P. Ladd, quartermaster on watch of the "Chicago," taken January 4, 1934, pursuant to stipulation. I also offer in evidence the deposition of M. J. Verick, port lookout of the "Chicago," G. F. Farrell, chief signal man on watch on the "Chicago"; W. T. Wommack, throttle man; C. A. Smith, throttle man, B. Cumbie, depositions taken on March 15, pursuant to stipulation. The remaining portion of the testimony of W. P. Birchmire, which was taken before your Honor, but the last part of which was completed because your Honor had to sit in a three-judge case. I also offer in evidence the deposition of Charles R. Demer, quartermaster, taken on March 20, 1934, pursuant to stipulation, and the deposition of Lieut.-

Commander L. R. Gray, navigator of the "Chicago," taken March 20, pursuant to stipulation. I will say that the last two depositions were taken because your Honor had to sit in the three judge case.

At this time I will offer in evidence Exhibit B for identification and ask that it be marked Government's Exhibit next in order. I will remind your Honor that this Exhibit B for identification was the photostatic copy of the "Louisville" test trial upon which Admiral Simons computed the curves which the "Chicago" at her revolutions ahead and then the dropping of the curve to 110 astern. At the time that was identified the testimony of the various throttle men had not been taken, but since the testimony has ben taken and I offer this in evidence as Government's Exhibit next in order.

The COURT: It will be received as U. S. Exhibit 14 in evidence.

(The document was marked "U. S. Exhibit 14.")

Miss PHILLIPS: At this time I will ask counsel if he is prepared to offer to the Court a model of the "Silver Palm" drawn to scale, showing an exemplar of her length, breadth, and beam.

Mr. LILLICK: Mr. Ensor informs me that he has in San Francisco [558] an exact model of the "Silver Palm." It is a very expensive model. I think your Honor has seen similar models. If that may be offered in response to this request of Miss Phillips and some arrangement made under which it may be kept subject to the order of the Court and

produced in court, so that we can get it again, we will bring that out.

Miss PHILLIPS: You will remember I offered a model of the "Silver Palm" as an exemplar of her length, breadth, and width, made upon the same scale as the "Chicago," totally for the convenience of the court. I will renew the offer of the exemplar in court of the "Silver Palm" solely for your Honor's convenience. I do not believe that an exemplar of the "Silver Palm" made upon a different scale is going to help your Honor in the same way and with the same convenience as the exemplar that I am offering. I have no objection to counsel offering his exemplar for whatever purpose he sees fit, but it must be apparent to you that it would not serve the same convenience that the exemplar of the "Silver Palm" which I have offered, which is on the same scale as the "Chicago."

Mr. LILLICK: We will have prepared and offered as an exhibit a model of the "Silver Palm" drawn to the same scale that the "Chicago" is drawn.

Miss PHILLIPS: That would be very satisfactory.

Mr. LILLICK: I will only ask that when our model is brought to Court that the other model be taken away.

Miss PHILLIPS: Certainly. The convenience of having two models drawn to the same scale is so apparent that I do not see why there should be any argument about it.

The COURT: You have the assurance of Mr. Lillick that it will be produced.

Miss PHILLIPS: I next want to offer a certified copy of an [559] order of the Superior Court of the State of California issuing special letters of administration to the Bank of America, National Trust & Savings Association, in the Estate of John W. Troy, and I ask that that be marked as U. S. Exhibit next in order.

The COURT: It will be received as U. S. Exhibit 15.

(The document was marked "U. S. Exhibit 15.")

Miss PHILLIPS: I will ask your Honor at this time for an order joining the Bank of America, National Trust & Savings Association as a co-libelant in this suit.

Mr. LILLICK: No objection.

Miss PHILLIPS: My reason for that is that originally I presented the claim in favor of Mrs. Troy, the widow of John Troy and, and her five children, in the name of the United States of America, the United States being the trustee for her. I am convinced that the administrator is the proper party.

The COURT: Counsel says he has no objection, and that will be received as U. S. Exhibit No. 15.

Miss PHILLIPS: I will offer in evidence as U. S. Exhibit next in order a certified copy of the Probate Court of the Commonwealth of Massachusetts appointing Ethel G. MacFarlane administratrix of the Estate of Harold A. MacFarlane.

The COURT: It will be received as U. S. Exhibit No. 16 in evidence.

(The document was marked "U. S. Exhibit 16.")

Miss PHILLIPS: I am going to ask leave of court to present at the time of my rebuttal evidence a certified copy of the order appointing the widow of Lieut. Chappelle administratrix of the Estate of Lieut. Chappelle. I might say that I had such copy, but it has been misplaced, and a thorough search of the office has not found it, so I wired Mrs. Chappelle to send a copy of it when it is received. [560]

The COURT: We will have to wait until the copy arrives before it is marked.

Miss PHILLIPS: Counsel has asked one or two questions for points of information, which we are supplying him, and I would ask leave to have Lieut.-Commander Dees take the stand to answer one or two questions that counsel has asked, and one further question that I would like to ask which I believe the record is not complete on, but it is a matter of immaterial consequence, and if counsel should object to it on the ground that Lieut.-Commander Dees has been present throughout the trial I would not have any objection to withdrawing the question.

Mr. LILLICK: I have no objection to any testimony on that ground that Lieut.-Commander Dees may give.

RANDAL E. DEES,

Called for the United States, sworn.

Miss PHILLIPS: Q. Will you please give your full name?

A. Randal E. Dees.

Q. What is your station, please?

A. Lieut.-Commander, United States Navy, attached to and serving on board the U. S. S. "Chicago" as gunnery officer.

Q. You were asked to find out what the record was of *a named* Hanes, to whom previous witnesses have referred. What were the circumstances of his leaving the "Chicago"? Have you a record upon that?

A. I consulted the records kept in the executive office of the U. S. S. "Chicago," that is the office that handles all matters of personnel, transfers, discharges of enlisted men, and I found the following record: "Hanes, Dallas, Machinist's Mate, Second Class, Date of Enlistment 19th of January, 1930; Received on board the "Chicago" on February 2, 1932. Discharged from Navy on the 17th of January, 1934, at Mare Island, California, with an [561] honorable discharge, by reason of expiration of enlistment."

Q. A question was asked by counsel of Mr. Colton to give the whole weight of the revolving mechanism of each of the "Chicago's" propellers. I believe that was the question asked. What did you find out as to that?

(Testimony of Randal E. Dees.)

A. These records were not on board the vessel. If it is necessary for the Court to have this information, that information can be obtained from the builders, the United States Navy Yard at Mare Island.

Miss PHILLIPS: I might say that that record will be here by Tuesday.

Q. Now, there is a question I want to ask the witness: "Do you know in what waters the "Chicago" operated during the four months preceding the collision?"

A. I can answer from the 2nd of July, 1933, to my own knowledge; I joined the ship on that date at Bellingham, Washington, and thereafter we operated out of Puget Sound and in Pacific Waters between there and the area of San Diego, making the ports of San Francisco and San Pedro.

Q. I have one more question to which counsel has the privilege of objecting: Have you ever examined the orders of the engineering department of the "Chicago" referring to the privilege or right in any way for machinist's mates not on duty to be in the engine-room when they are off duty?"

A. Last night on board the "Chicago" I examined the orders of the engineering department issued by Engineer Officer Lieut.-Commander Colton and only in respect to this one point, and I found no order barring any men not on watch from the engine-room.

Miss PHILLIPS: That is all.

(Testimony of Randal E. Dees.)

Cross Examination.

Mr. LILLICK: Q. How long back did you go over the orders that you examined of Mr. Colton?

A. As the "Chicago" has only been in commission for about three years the list of orders were not [562] very extensive, and I looked over the orders from the beginning.

Q. In other words, it was not just the orders applicable to the last few days, but it was a general order book?

A. I began with the first order issued from the date of commission of the ship in that department.

Q. It is not customary, however, is it, to have men off duty in the engine-room, or do you know of that?

A. You were asking me about custom. I would say I know nothing against men being in the engine-room when off duty unless the engineering officer of that ship should so prohibit. If I were the engineer-officer I would be very much delighted for a man to show enough interest in his duty to go down there in the engine-room and do work when not on watch.

Q. As a matter of actual practice, do you deem it to be concomitant with efficiency to have throttle men talk to other men while they are engaged in the performance of such duties as come to them when an emergency exists? I am simply asking a simple question of efficiency.

(Testimony of Randal E. Dees.)

A. I can imagine many cases where talk would not interfere, and in the case of an emergency if a second man were standing by or even were in the immediate neighborhood and could come to the assistance of the man there that he might expedite and make more quick a response to the orders, even if it involved some amount of talk to the man in order to co-ordinate the joint efforts of the two men.

Q. That is assuming that they are aiding each other in the duties. I am discussing a situation where a man is there and he engages in conversation, having nothing to do with the ship, and asking you whether, in your opinion, that is in the interest of efficiency.

Miss PHILLIPS: I think we are going on to an academic discussion. There is no testimony in this case, either directly or indirectly, indicating that any such situation has existed, upon which [563] counsel is now asking the witness, and I object to the the question as immaterial.

Mr. LILLICK: I disagree with Miss Phillips that there is no testimony in the case even indirectly involving men being in the engine-room talking about other things.

The COURT: I think your question answers itself. Of course, if a man's attention was detracted from his duty it would not be proper.

Mr. LILLICK: I think so.

Q. Commander, while you were looking up Hanes' discharge did you look up the other man's discharge?

(Testimony of Randal E. Dees.)

A. No, I did not look it up, because I was only asked for the discharge of Hanes.

Mr. LILLICK: That is all.

Miss PHILLIPS: That is all.

Mr. LILLICK: Have you a copy of the demand that you served upon us for log-books?

Miss PHILLIPS: The demand for logs has been complied with, as far as I know, except the bell-books. I think the other logs were handed over by you the day before yesterday. Might I say that I did not take the formality of advising the Court that we had complied with Mr. Lillick's demand for logs. I believe it was complied with the last week in February, but I would like the record to show I assumed it was not necessary, because if he did not get the logs it would then be called to the attention of the Court.

Mr. LILLICK: In response to a demand for the production of the log-books of the "Silver Palm," a notice was served upon us January 26, 1934, calling upon us to produce "All original deck logs of the "Silverpalm" in the possession or under the control of the Silver Line, Limited, from the time ownership of said ves- [564] sel was acquired by the Silver Line, Limited, and which show her operations during said time to the date of said collision, or, in the case of legal impossibility to produce said original deck logs, to produce duly certified copies of them or photostatic copies of them.

“All originals engine room log books of the “Silverpalm,” in the possession or under the control of the Silver Line, Limited, from the time ownership of said vessel was acquired by the Silver Line, Limited, and which show her operations during said time to the date of said collision, or, in the case of legal impossibility to produce said original engine room log books, to produce duly certified copies of them or photostatic copies of them.

“All original bell books or maneuvering books of the “Silver Palm” in the possession or under the control or the Silver Line, Limited, from the time ownership of said vessel was acquired by the Silver Line, Limited, and which show her operations during said time to the date of said collision, or, in the case of legal impossibility to produce said original bell or maneuvering books, to produce duly certified copies of them or photostatic copies of them.

“Any other original records or books of the “Silver Palm” in the possession or under the control of the Silver Line, Limited, from the time ownership of said vessel was acquired by the Silver Line, Limited, and which show her operations during said time to the date of said collision, or, in the case of legal impossibility to produce said original records or books, to produce duly certified copies of them or photostatic copies of them.

“Schedule of the SS “Silver Palm” for her contemplated voyage from the Port of San Francisco to the port of New Orleans, Louisiana, and there-

after, to ports in South Africa, as described in the petition for limitation of liability, in the pos- [565] session or under the control of the Silver Line, Limited.”

We sent to the owners in London, and they forwarded to us something over 100 original deck logs and original engine-room logs, and notified the Government, and those have been at our office since and subject to the inspection of the Government and have been examined.

Miss PHILLIPS: Those are the log-books in the limitation case. The log-books have nothing to do with the collision case.

Mr. LILLICK: So that there may be no misunderstanding on the part of the Court, certain of the testimony that has been introduced before the Court or in the depositions will have a bearing on the limitation proceeding. The understanding between counsel is, at least it is my understanding, Miss Phillips, that either of us shall have the right to use any of the testimony in the collision case where it may be pertinent to points that may be involved in the limitation proceeding.

Miss PHILLIPS: So stipulated.

Mr. LILLICK: These engine log-books and deck log-books, as I say, have been examined by representatives of the Government, and they are at our office subject to call.

Miss PHILLIPS: I will point out with the exception of the bell books and also as to the schedules.

Mr. LILLICK: The demand was couched in such language as to call upon us in case of legal impossibility to produce originals to produce certified copies, and we cannot produce the bell books, and I have offered in evidence an affidavit.

Miss PHILLIPS: This affidavit shows what I have already stipulated to, that the original deck and engine-room log-books have been produced. We do not need to talk about that; the engine-room bell-book of the "Silver Palm" for the particular voyage, counsel [566] has produced that. The affidavit goes on to say that if there are any other bell-books the "Silver Palm" has them itself. This affidavit is sworn to on the 27th of February, 1934. I do not consider that affidavit a sufficient explanation of why those bell-books of the "Silver Palm" have not been produced. My position is I noticed counsel to produce these bell-books in January, I do not remember the exact dates but the record will show, and an affidavit is made on the 27th of February by somebody in London that they have not the bell-books there, and if they have them the "Silver Palm" still has them on board. I do not consider that a sufficient explanation of why they are not produced.

Mr. LILLICK: I will offer this affidavit.

Miss PHILLIPS: I object to that. I will stipulate that counsel has produced the original deck logs that I have asked for, the engine-room logs and the bell book of the particular voyage, but he has not

produced the other bell-books and he has not given a sufficient reason why he has not.

Mr. LILLICK: It was my recollection that in one of the notices there was a demand that if we were unable to produce any of the records demanded that we furnish a reason for it. I offer by an affidavit from Stanley Miller Thompson, sworn to by him as a director of the Silver Line, Limited, to show that the company has in its possession or power all the original deck and engine-room log books of the "Silver Palm" covering the period from her first voyage to the 25th day of October 1933; the engine-room log-books of the "Silver Palm" covering maneuvers from 11th October, 1923, to 25th October, 1933; the engineer's scrap log-book commencing noon September 30th, 1933 to October 24th, 1933, and the scrap log-book No. 16, commencing August 31, 1933, and ending 25th October, 1933, and the schedule of the "Silver Palm" for her contemplated voyage [567] from San Francisco to New Orleans and thereafter to ports in South Africa.

Further, I offer to prove by this affidavit of Stanley Miller Thompson that they have not in their possession or power any other original bell-books, scrap logs, or maneuvering books of the "Silver Palm" and have no knowledge of whether any such exist, but if the same exist they are on board the "Silver Palm" which vessel is at present at Calcutta. I offer to prove that by this affidavit and offer it in evidence.

Miss PHILLIPS: I object to it on this ground, the affidavit, itself, shows by its own terms that it is an insufficient explanation of failure to comply with the notice to produce.

The COURT: I do not know that I understand the matter. Perhaps the issue is one that I have not met in admiralty before. I do not see, however, any reason why he could not present that and have it received, but that does not mean that it will be received as an explanation for the absence of the logs. It can be received as showing what was offered. I don't know of any rule that I should not receive it.

Mr. LILLICK: I propose to follow it up. I am laying a foundation for something else that I am proposing to do in a few minutes.

The COURT: I do not understand. I am in a position to refuse to receive it.

Miss PHILLIPS: I withdraw the objection to the offer. If Mr. Lillick can't make the explanation for the failure to produce I have no desire to take advantage of him.

Mr. LILLICK: Do not put it on the ground of putting us in an embarrassing situation.

The COURT: In other words, I am not receiving it as necessarily an explanation but I am receiving what is offered by Mr. Lil- [568] lick as in part an explanation for the failure to produce. It will be received as Respondent's Exhibit 12.

(The document was marked "Respondent's Exhibit 12.")

Mr. LILLICK: The only books that I know of that have not been produced are the bell-books and the maneuver book.

Miss PHILLIPS: We have no schedules.

Mr. LILLICK: The schedule I now hand to Miss Phillips.

The COURT: If these books are on the "Silver Palm" why couldn't they be cabled for?

Mr. LILLICK: We have done it. The "Silver Palm" was at sea; we cabled for them and we are expecting a reply from the ship today. The vessel was to put into Singapore today, and if a cable comes that the bell-books are aboard they will be here in time to be considered by the Court. If they are not on board there will be a witness who will testify with respect to it. What I am trying to show is——

The COURT: You are trying to show good faith on the part of your office.

Mr. LILLICK: To show diligence on our part to give Miss Phillips all that we have. I have handed Miss Phillips the schedule demanded in the notice to produce, but I think the schedule will need explanation.

Miss PHILLIPS: Yes, this covers other months.

Mr. LILLICK: That is why I say I think it will need explanation.

Miss PHILLIPS: Both of these cover May, June, July and August. I do not accept these as a compliance with the notice. Unless the other infor-

mation is given I do not want to be understood that I am accepting these.

Mr. LILLICK: What other explanation do you need? [569]

Miss PHILLIPS: I want what I have asked for. I have asked for the "Silver Palm's" schedule of her voyage on which she was engaged in October, 1933, and I have here a schedule showing her schedule for the months of May, June, July and August, 1933. Unless something more is added that is certainly not a compliance with the notice to produce. I want to call attention that my notice to produce these records is dated January 24, 1934, which is two months ago.

Mr. LILLICK: Are you making any point that this is putting you at a disadvantage with respect to your case?

Miss PHILLIPS: Of course, I wanted this schedule some little time ago; we began our examination of the books on the 12th of March, the day before the trial began. I thought the schedule would be produced at that time. It did not make any great difference, it has not put me to any particular disadvantage, but I have not yet got the schedule which I asked for.

The COURT: If you have finished with the offer let us proceed.

Mr. LILLICK: I will call Captain Ensor.

THOMAS A. ENSOR,

Called for the Silver Line, Limited, sworn.

Mr. LILLICK: Q. Captain Ensor, I hand you the schedules which a few moments ago were handed to Miss Phillips and ask you to read from them the schedule of the steamship "Silver Palm" for the contemplated voyage from the Port of San Francisco to the Port of New Orleans, Louisiana, and thereafter to ports in South Africa.

A. The voyage referred to commenced at Vancouver, October 17, San Francisco sailing October 21, arrival at Cape Town December 13, Port Elisabeth December 15, East London December 16, Durban December 17, Lourenco Marquis December 20, Bombay January 5, Madras [570] January 14, and Calcutta January 18.

Miss PHILLIPS: May I look at that? Will you pick out the dates on which the "Silver Palm" sailed from Vancouver on this voyage?

A. The voyage commences at Vancouver; these two are the dates of leaving from the respective ports. These are the arrival at the ports. Now, the other sheet gives the gulf arrivals. You see, two schedules are published, one for the ships on the Gulf and one for the ships on the Pacific Coast, so the entire schedule is on the two sheets.

Miss PHILLIPS: I think I am quite wrong in my objection. I would like to offer this in evidence as Government's Exhibit next in order.

The COURT: It will be received as U. S. Exhibit 17.

(The document was marked "U. S. Exhibit 17.")

(Testimony of Thomas A. Ensor.)

Miss PHILLIPS: I had planned to call Mr. Ensor as a witness on rebuttal. Might I question him at this time on the point I wish to question him on as to records?

Mr. LILLICK: No objection.

Miss PHILLIPS: All I want to ask you, Captain Ensor, is there were tendered to us last week quite a number of log-books of the "Silver Palm." Did those logs come to you from the owners in London?

A. Yes.

Q. There also came reports, I would say, from the captain from port to port, that is a report apparently indicating that at certain ports he would send to his owner a report of the voyage to that date in port, and then subsequent dates: Is that correct?

A. They are what are known as abstracts of logs. The logs are kept on the vessel until the completion of the voyage, but in order to keep the owners advised with respect to what the ship actually did abstracts are sent at frequent intervals. [571]

Q. Frequent intervals?

A. Yes.

Q. That was the purpose of these abstracts?

A. Yes.

Q. And they came to you from the owners?

A. Yes.

Miss PHILLIPS: That is all.

Mr. LILLICK: Miss Phillips, might I ask whether inadvertently I have failed to produce anything but the bell-books and the maneuver books, which it is my understanding are those that may be on the "Silver Palm"?

Miss PHILLIPS: I think I have already said that you had produced the various deck logs, and I think the engine-room logs, and the bell-books or maneuver books had not been produced for other than the particular voyage in question.

Mr. LILLICK: We offer the depositions of Donovan M. Pitt, assistant engineer on the "Silver Palm"; the deposition of Jeffrey Newhours, second engineer of the "Silver Palm"; the deposition of John Oswald Tough, junior fourth engineer on the "Silver Palm"; the deposition of Osman Bin Puteh, bow lookout of the "Silver Palm"; the deposition of Maharick Bin Latip, helmsman of the "Silver Palm"; the deposition of George Ellis Stanley, third officer of the "Silver Palm," the deposition of Bernard Thomas Cox, captain of the "Silver Palm," the deposition of Selwyn Norman Capon, captain of the steamer "Albion Star," the deposition of James Roy Harding, the first mate and chief officer of the "Albion Star," the deposition of Irik Irvine, fourth officer of the "Albion Star," and the testimony of Chief Engineer of the "Silver Palm," G. H. Low, taken before the Naval Court of Inquiry, commencing on page 149 and ending on page 155, which it was understood when that testimony was taken that if either of us cared to offer it in evidence it might be offered in evidence.

Miss PHILLIPS: That is correct. He testified before the Naval [572] Court of Inquiry, and it was stipulated at that time that that testimony might be placed in evidence.

The COURT: It will be received.

Mr. LILLICK: I will hand the reporter the testimony so that it may be copied into the record at this point. That covers all of the depositions I have to offer.

(The testimony of

G. H. LOW

referred to is as follows:) [573]

“Examined by the Judge Advocate:

“1. Q. State your name, occupation, and residence.

“A. G. H. Low, chief engineer, 1096 Shields Road, Newcastle-on-Tyne, England.

“2. Q. Were you chief engineer of the M. S. ‘Silver Palm’ on the 24th of October, 1933?

“A. Yes, sir.

“3. Q. How long had you been serving as chief engineer on the ‘Silver Palm’?

“A. Since July of this year.

“4. Q. Are you a qualified engineer?

“A. I am, yes.

“5. Q. How much experience have you had with Diesel engines?

“A. Some nine years.

“6. Q. Are the Diesel engines on the Silver Palm air starting?

“A. Yes.

(Testimony of G. H. Low.)

“7. Q. Is air from the same air bottles used to start the engines as air used to sound the whistle? Or are they different?

“A. The same air bottles, yes.

“8. Q. What are the size and capacity of these bottles?

“A. One hundred sixty-five cubic feet each—three bottles.

“9. Q. What is the pressure of these bottles?

“A. Six hundred pounds to the square inch.

“10. Q. Do you mean 165 cubic feet per bottle or total for the three bottles?

“A. Per bottle. That would be 495 total.

“11. Q. Will you tell the court the length and diameter of the air bottles?

“A. Twelve feet 8 overall length, and 4 feet 3 inside diameter—cylindrical bottles.

“12. Q. Did you have a flywheel on your main engine, and if so what is the size and weight of the flywheel?

“A. I could not give you that definitely—only approximately.

“13. Q. Give me an approximation then of the size.

“A. The flywheel will be in the neighborhood of about 7 feet [574] diameter. And the weight? Of course it would only be a very rough guess if I gave you that now; about 15 tons.

“14. Q. Your scavenger air for the main engines is taken right off of a cam shaft to your main engines?

(Testimony of G. H. Low.)

“A. Driven direct from the crank shaft of the main engines, yes.

“15. Q. When you stop your main engines (your main engine is going ahead), you put your controller on ‘Neutral’?

“A. Yes.

“16. Q. This cuts your oil, does it not?

“A. You shut your oil off straight away, first, and then put your main control in the ‘Stop’ position.

“17. Q. When you put your main control in the ‘Stop’ position does this release the compressor on the engine?

“A. No, it has nothing to do with the compressor at all. It merely cuts the fuel off and cuts the fuel valves out of operation.

“The Court asked the witness to repeat his answer.

“A. You cut the fuel off of the engine, and the control that takes all the fuel valves out of operation.

“18. Q. Then with the engine turning over, there is still a compression in each cylinder at each stroke?

“A. Yes, you still have the compression there.

“19. Q. There is no release to that?

“A. No.

“20. Q. Does this compression tend to stop the engines?

“A. Yes, it acts as a brake.

(Testimony of G. H. Low.)

“21. Q. How long does it normally take to stop the engine from going ahead at 108 revolutions per minute? To bring it to a stop?

“A. That is a very difficult thing to say. It may take a minute, or a little longer. It varies with the conditions—of sea, wind, and that sort of thing.

“22. Q. The momentum of the flywheel would tend to keep the engines turning over, would it not, after the fuel is cut?

“A. Yes, all flywheels have that tendency. [575]

“23. Q. And also the propellers would tend to keep turning the engine over?

“A. Yes . . . Well, you have the reverse effect, with the water dragging the propellers around they are putting in work in the engines, whereas normally the engines are putting work in the propellers.

“24. Q. Yes, I understand that. But as long as the ship is making way through the water, the propellers would tend—

“A. Yes.

“25. Q. —as long as your engines are turning over in the ahead movement, there is no way that you can give them any starting air to stop them and reverse them, is there?

“A. No, they should be stopped before you reverse them—before you put the fuel on the ‘Astern.’

“Cross-examined by counsel for Captain Kays and
Lieutenant Minter:

“26. Q. Have you ever had occasion to test or experiment with the engines on the *Silver Palm* to

(Testimony of G. H. Low.)

determine how long it takes to reverse the engines from a speed of 108 revolutions ahead?

“A. No, we have never had occasion to make a quick reversal from those revs.

“27. Q. Have you any knowledge of how long it would take to reverse the engines of the Silver Palm from 108 revolutions per minute ahead?

“A. Why, I could not say definitely how long it would take. It depends greatly on different conditions of loading and trim and seaway.

“28. Q. The engines of the Silver Palm were going ahead at 108 revolutions per minute: Before they could be reversed it is necessary to put the controls to the ‘stop’ or ‘Neutral’ position, is it not?

“A. Yes, to bring them to ‘Stop.’

“29. Q. And before those controls could be engaged in ‘Reverse’, it is necessary that the propeller shafts cease turning from ‘Ahead’? is that correct?

“A. Essentially that is correct; but actually the controller governor could be put in the ‘Astern’ [576] condition, but the fuel would not be put in there before the engines were stopped.

“30. Q. So, if the controls were put in the ‘Reverse’ position, it would not have any effect on the engines?

“A. No.

“31. Q. And you do not know how long it would take for the engines to idle down to a stop from 108 revolutions ahead?

“A. I could not give a definite figure on that.

(Testimony of G. H. Low.)

“32. Q. Were you in the engineroom of the Silver Palm prior to the collision on the 24th of October?

“A. No, not just prior to it. I was going down when I heard the telegraph ring.

“3. Q. Which ring do you refer to?

“A. The first ring, I think it would be.

“34. Q. When the Silver Palm collided with the Chicago were the engines actually in reverse or not?

“A. No, they were in ‘Stop’ position.

“35. Q. By that, you mean the controls were at ‘Stop’?

“A. At ‘Stop’, yes.

“36. Q. The engines were still going ahead?

“A. Very slowly, but stopped immediately with the collision.

“37. Q. Immediately after the collision?

“A. Yes.

“38. Q. Do you know what revolutions they were making ahead before the collision?

“A. No, I could not tell you that. . . . It would be a pretty low rate of revolutions; the revolutions drop very quickly when the fuel is shut off.

“39. Q. But you are unable to tell us how long it takes to stop the engines from 108 revolutions?

“A. Not definitely. It may take a minute, or somewhat longer. I could not say a definite figure. I don’t think anyone can.

“40. Q. Have you ever discussed with the Master of the Silver Palm, prior to the collision, the

(Testimony of G. H. Low.)

kind of engines that you had on the Silver Palm and their inability to be promptly reversed? [577]

“A. No, I never discussed that in that light with him.

“41. Q. Was he familiar with the fact that it takes a relatively long period of time to reverse the engines of the Silver Palm from 108 revolutions ahead?

“A. I really could not say. I should think he would, though.

“42. Q. If the bridge signals the engineroom, ‘Full speed astern, both engines,’ and immediately thereafter again signals the engineroom, ‘Full speed astern, both engines,’ what does that indicate?

“A. Urgent—the record full speed astern.

“43. Q. Would the urgency of the situation make any difference in the engineroom in answering the first signal or acting upon it?

“A. No, the first signal would be answered right away. But in occasion like such as that—in case of emergency, where a thing has got to be done quickly as possible at any cost, then they give a double ring so that if there are any chances to be taken you are quite entitled to take them.

“44. Q. Did you say ‘chances taken’?

“A. Yes. It is the usual marine procedure that on any type of engine or ship—say on a turbine, if you have got a double ring astern you can put all the steam on the turbine astern and risk an accident.

(Testimony of G. H. Low.)

“45. Q. Was that done on the 24th?

“A. Yes, everything was done promptly.

“46. Q. Do you know whether or not an attempt was made to put the engines in reverse prior to the collision?

“A. No, there had been no attempt really made. In fact, I believe there were further movements on the telegraph after the collision.

“47. Q. Have you discussed the collision with the Master of the *Silver Palm* since its occurrence?

“A. No, I haven't gone into the thing with him at all.

“48. Q. Have you heard him make any comments regarding the circumstances of the collision?

“A. No, nothing. [578]

“Examined by the Court:

“49. Q. You stated that the receipt of the emergency backing signal authorizes you to use every effort to obey the signal?

“A. Yes.

“50. Q. Would the execution of the signal, ‘Emergency, back, full,’ have been expedited had you admitted air to your cylinders? To start the engine backing?

“A. No, it would not—quite the reverse! There are features with the Diesel engine running ahead and you have the gear in the astern position and give her fuel, she is liable to continue running ahead.

(Testimony of G. H. Low.)

That's the case inevitably with all Diesel engines; she would continue running ahead.

"51. Q. Are these engines Diesel or semi-Diesel?

"A. Well, the makers claim Diesel; but they are of similar class to semi-Diesel.

"52. Q. In other words, you have a heating element in your cylinders to heat the oil for combustion in advance to the heat due to the compression of the air in the cylinders?

"A. Well, we have a higher circulating water temperature, which has that effect.

"53. Q. It has that effect?

"A. Yes.

"54. Q. Well, is this heating element just the general heat of the cylinder walls or the extra heat in some portion of the cylinder walls, or cylinder head?

"A. Well, we allow the jacket water to rise to a certain figure and keep it there.

"55. Q. How long have you been on the Silver Palm?

"A. Since July of this year.

"56. Q. Have you served on sister ships of the Silver Palm in that line?

"A. No, not on a sister ship. On a single screw type of vessel, with a bigger powered engine.

"57. Q. Have you ever been through the Panama Canal with a single screw type?

"A. No, I have never been through the Panama Canal.

(Testimony of G. H. Low.)

“Recross-examined by counsel for Captain Kays
and Lieutenant Minter:

“58. Q. Where were you at the time of the col-
lision? [579]

“A. Just on top the engineroom—just going
down.

“None of the parties to the inquiry desired fur-
ther to examine this witness.”

The COURT: We will take a recess now until
two o'clock p. m.

(A recess was here taken until two o'clock
p. m.) [580]

Afternoon Session.

JAMES BARCLAY,

Called for the Silver Line, Limited, sworn.

Mr. LILLICK: Q. Mr. Barclay, where are you
at present employed?

A. The Moore Dry Dock Company, Oakland.

Q. In what capacity?

A. In the capacity of Naval Architect.

Q. How long have you been with the Moore Dry
Dock Company?

A. This time fifteen months; previously, from
1920 to 1923.

Q. What was your experience before going to
Moore's? Will you start with your earliest experi-
ence and then give your experience through your

(Testimony of James Barclay.)

life up to your present position of naval architect?

A. I served an apprenticeship for six years as ship's draftsman and after coming out of my apprenticeship I worked with the Fairfield Shipbuilding Company, Glasgow, Newcastle-on-Tyne, Campbell Laird, assistant chief draftsman. In 1916 I entered the services of Skinner & Eddy Corporation as naval architect to design some vessels that they wanted for their own use that was known as the 8800-ton ship which was afterward adopted as standard by the United States for war service. From 1916 to 1920 I was with the Skinner-Eddy Corporation, and then was employed by the Moore Shipbuilding Company from 1920 to 1923.

Q. During your years of experience have you had to do with repairs made upon vessels that had been involved in collisions?

A. Oh, yes, that is part of the work, every-day work of a shipyard.

Q. And as to the period during which you were designing vessels, you were also in positions where the yards were constructing vessels?

A. Yes.

Q. And occupied what position in that respect?

A. The naval architect in a shipbuilding company establishment has [581] charge of the drawing office and all of the technical work of the institution, and also has an advisory capacity to the foremen and managers in the yard.

Q. Were you with the General Engineering Company, also?

A. Yes.

(Testimony of James Barclay.)

Q. How long were you with them?

A. From 1924 to 1930—six years.

Q. During that time, and while you have been with Moore's, have you been in charge of the repairs made to the vessels that have been repaired by them that have been in collision?

A. Yes.

Q. I hand you three photographs, which we will offer separately later, and will ask you whether you know where those photographs were taken.

A. Yes. These photographs were taken at the behest of the Moore Dry Dock Company when the vessel was on our No. 4 dry dock.

Q. When did the "Silver Palm" come to your drydock No. 4?

A. October 29, 1933.

Q. Was that the drydock upon which she was first taken out of the water after her collision with the "Chicago"?

A. Yes.

Q. I hand you one of these photorgaphs and ask you what that represents, relative to which bow of the "Silver Palm" it is.

A. This is the port bow of the "Silver Palm."

Mr. LILLICK: We offer this photograph as our next exhibit.

The COURT: It will be received as Respondent's Exhibit 13 in evidence. That is a photorgaph of the port bow?

Mr. LILLICK: That is a photograph of the port bow, of the "Silver Palm."

(Testimony of James Barclay.)

(The photograph was marked "Respondent's Exhibit 13.")

Q. I hand you another photograph and ask you whether that was taken on the same occasion, and what it represents.

A. Yes. This is a photograph taken on the same occasion, but from a rather different angle. It is taken at an oblique angle to [582] the bow, which shows not quite perpendicular to the stem, but a few degrees of it.

Q. Which bow?

A. Port bow?

Mr. LILLICK: We offer that as our next exhibit.

The COURT: It will be received as Respondent's Exhibit 14.

(The photograph was marked "Respondent's Exhibit 14.")

Mr. LILLICK: Q. I hand you another photograph of the "Silver Palm" and ask you what that represents.

A. This is a photograph taken on the port side from aft of the damage looking forward on the port side.

Mr. LILLICK: We offer that as our next exhibit.

The COURT: It will be received as Respondent's Exhibit No. 15.

The photograph was marked "Respondent's Exhibit 15."

Mr. LILLICK: Q. I hand you Silver Palm" Exhibit No. 13, and ask you whether you can tell

from that photograph whether the vessel with which the "Silver Palm" came in contact was at the time (Testimony of James Barclay.)

of the contact dead in the water, going ahead, or going astern?

Miss PHILLIPS: That is objected to, the witness not having been shown to be qualified to answer that question.

Mr. LILLICK: If your Honor please, this witness, having had to do with the repair of vessels, his opinion for whatever it may be worth, will be measured and weighed by what the witness' qualifications are.

The COURT: In repairing ships have you been acquainted with at what angles the accident to those ships took place?

A. Yes, to a certain extent.

Q. In other words, you were informed or you made a study of the angle of collision at those times?

A. No, I did not.

Q. Then what do you predicate that opinion upon?

A. Upon the condition of the damage to the "Silver Palm" as I saw it.

Q. You feel that you can do it, as a naval architect?

A. Yes. [583]

The COURT: Of course, I don't know how broad the term "naval architect" is. You take a lawyer, he is supposed to be able to express himself about the law whether he expresses himself, or not;

(Testimony of James Barclay.)

a doctor who is admitted to practice and is licensed may be considered to have the necessary foundation to present a matter. I don't know whether the term "naval architect" is so broad in its scope that a man could be said to be able to give an expert opinion. This man says he has repaired ships and knows something about the nature of the accident. He feels that he is able to express an opinion as to the condition which the wrecked condition indicates. Do you feel that?

A. Yes.

Q. As to the force that must have been applied, is that the idea?

A. Yes.

The COURT: I don't know what the practice is as to foundation in a case of that kind.

Miss PHILLIPS: I don't think he has shown the qualifications.

The COURT: Will you indicate to what dergee he should have them?

Miss PHILLIPS: He has not really given us what a naval architect is supposed to do. He has indicated a naval architect designs ships and in his capacity repairs ships, but when it comes to analyzing forces, amount of forces, and direction of forces, combination of forces, and conflicting forces, I do not think he has shown anything at all. For instance, he says to a certain extent he knows the circumstances under which the vessels that he has repaired were in collision, to a certain extent.

The COURT: Would you like to examine him on the question of his qualifications?

(Testimony of James Barclay.)

Miss PHILLIPS: Yes.

Q. Mr. Barclay, counsel asked you some question, had you had occasion to consider the cause of collisions. Did I understand the [584] question right?

Mr. LILLICK: I did not ask that.

Miss PHILLIPS: I am not sure, I do not remember that, my notes are not very full. Did you understand that to be the question?

A. Will you repeat that, please?

Q. I understood counsel asked you whether or not in the course of your work you had had occasion to consider the circumstances under which collisions occurred, and how the damages that you repaired had occurred. I understood the question to be that in substance.

A. Yes.

Q. And I understood your answer to be yes, to a certain extent.

A. That is right.

Q. What do you mean by "to a certain extent"?

A. Just by observation of the damage to the vessel that came in to be repaired; we can visualize in what manner that damage has been done. It is a matter of experience in shipbuilding.

Q. Have you ever made any experiments to show the effect of colliding bodies such as ships?

A. No.

Q. You have not?

A. No.

(Testimony of James Barclay.)

Q. Then in these collision repairs that you are describing, in which you surmised the circumstances of the collision, were you taking, for example, the statements of officers who had told you the circumstances under which the collision occurred?

A. No, we analyze that from the condition of the ship.

Q. Well, I can see, all of us can see, when a ship comes in with a hole in the side, it is evident that something hit her; all of us can see that; and if she had a great deal of scraping along the side all of us can see there was something scraped her. But what I am getting at is, have you ever had any experience in experiment- [585] ing to see what is the cause that will bring about an action, a specified effect?

A. No.

Miss PHILLIPS: I rest on my objection.

Mr. LILLICK: Q. Mr. Barclay, how many vessels have you seen that have been in collision?

A. Probably 25 or 30.

Q. You have been in charge of plants where those vessels have been brought for repairs?

A. Yes.

Q. And in making those repairs, from your position as a naval architect or superintendent of the yard, have you had to examine closely the character of the repairs?

A. Yes, we always examine the damage on any vessel that comes into the yard; we have to examine

(Testimony of James Barclay.)

the damage on any vessel that comes into the yard; we have to examine it for survey to satisfy the classification societies.

Q. In making these examinations, do you have to take into consideration the question of stresses and strains?

A. No.

Q. In making these examinations do you come to a conclusion with reference to the direction from which the pressure has been exerted against the plates or frames of the vessel?

A. Very often.

Q. Did you, when the "Silver Palm" was on the dry dock over at Moore's, examine her with reference to that?

A. Yes.

Q. In examining her bow at that time did you come to a conclusion as to on which side that bow had been hit?

A. I did.

Q. In the photographs which I showed you can you show me anything from which you can determine from which side the pressure was exerted against that bow?

A. Yes. There was——

Miss PHILLIPS: Counsel is now asking a question beyond qualification. I want to ask more questions before the witness answers.

The COURT: Very well.

(Testimony of James Barclay.)

Miss PHILLIPS: Q. Is it not true that what you have had to do was you observed the damage in a ship and you repaired it? Isn't that your job?

A. That is right.

Q. What effect causes that you were not required to go into?

A. No. [586]

Q. Not at all?

A. Not at all.

Q. Your job was to repair the damage that was before you isn't that correct?

A. Yes.

Q. And do a good job of it?

A. Yes, that is right.

Q. When it came to analyzing all of the forces that causes that, that was not any of your business?

A. No.

The COURT: What I understand you are trying to say is that some force had been applied whereby it was folded in a certain way?

A. Yes.

Q. You are not in a position to say whether it was folded in that way by the angle of the blow, or it was thrown that way by a moving object: You are not going that far in your testimony?

A. No.

Q. In other words, you are going to say what you found in the damage, and there was some force, no matter what produced it, that twisted it in a certain way?

(Testimony of James Barclay.)

A. I have a definite opinion as to the reason for it.

Q. In other words, you are going to go even farther than tell what you found there as far as folding is concerned, by colliding against a moving object, or whether it was going into a non-moving object?

A. Yes.

Mr. LILLICK: We have a right to have his opinion with respect to the event no matter what that opinion may be worth.

Miss PHILLIPS: I do not object to the witness testifying as to the visible things he saw, but when it comes to stating the causes of the things he saw, he has certainly shown by his own statement not to be qualified to give the causes. In other words, he has made a study of effects and, under his own statement he has never intended to make a study of the causes.

The COURT: I do not know whether there are two theories here, or not. I can imagine that an angle of a blow might bend a bow, [587] and on the other hand I can imagine a force that would tear it around. Of course, I presume that is a matter of expert testimony under the facts of the case. Whether this witness can go far is a question. I think up to that point he has a right to testify to what he saw, and there was a force applied, and whichever way it was applied the question is the application of the forces. I have no idea as to

(Testimony of James Barclay.)

whether he can testify whether the blow came in a certain angle. Do you feel that you have had experience enough so as to testify as to whether that was due to the other object moving or the angle at which there was impact?

A. Well, the only thing that I could say—

Q. (Interrupting) You could not go that far?

A. No.

Q. If you cannot go that far I do not see you cannot tell—you can say some force bent something in a certain way, that is all?

A. Yes, that is all.

Q. In other words, you can say from the physical condition of that object that a force in a certain direction produced that result?

A. That was my intention.

Q. But you are not to go into that further point that I have mentioned?

A. No.

Q. In other words, you are not going to endeavor to say whether it was a moving object or a non-moving object that was struck. You see the situation. Of course, up to that point, that is the only question I have about you in my mind, as to whether you can testify as to that point, unless you say that you have qualifications to answer that particular point, because sometimes that force might be produced in two different ways.

A. I agree with you.

(Testimony of James Barclay.)

Mr. LILLICK: Q. Bearing in mind what the Court has just said, and the limitations put upon your testimony, will you tell us from which direction the force was applied to the bow of the "Silver Palm", according to the direction shown in that photograph? [588]

Miss PHILLIPS: I do not believe that comes within the limitation. That is going back to analyzing the cause. The witness has said he can analyze the effect and explain what he saw, but when it comes to going back to the cause of what he saw he cannot testify.

The COURT: I suppose he can testify that the bow was bent over to the left.

Miss PHILLIPS: He can say the bow was crushed over to the left, yes.

Mr. LILLICK: May I have the question read?

The COURT: Read the question.

(Last question repeated by the reporter.)

Mr. LILLICK: Q. I said to follow the Court's limitation and tell us from which direction the force had been applied.

A. According to the photograph, the force was applied to the starboard side, the starboard bow of the "Silver Palme," which was crushed in and the port bow was bulged out.

The COURT: Q. In other words, the stem was turned over considerably.

Q. It was buckled?

A. It was turned over to port approximately five feet, I should say.

(Testimony of James Barclay.)

Mr. LILLICK: Q. You have given your answer from an examination of Silver Palm Exhibit No. 13.

A. There is another photograph that shows the side.

Q. I show you Silver Palm Exhibit 14 and ask you to indicate to us—will you put it on the desk—where, if at all, on that photograph there appears evidence that you have spoken of of the “Silver Palm’s” bow being moved over from the starboard side to the port?

A. This is the starboard side of the vessel, and these are the bow plates which have been turned over, and the stem, instead of being in the center, here, the stem was broken at the [589] 25-foot line and pushed over approximately five feet off of the center, and the shell plating on the port bow was torn away from the frames until it was held by the collision bulkhead about 25 feet at the center line—it shows that the force came from starboard to port.

Miss PHILLIPS: I want to move to strike out the last sentence, “It shows that the force came from starboard to port.” That is directly against the ruling of your Honor.

The COURT: Q. It came from the starboard angle, didn’t it?

A. Yes.

Q. You don’t know what the angle was?

A. No.

(Testimony of James Barelay.)

Q. The angle was, in your opinion, that it came around from the starboard side?

A. From the starboard side to the port side.

Q. Of course, from the starboard to port means absolutely across, like bending right over, but it came at an angle of some kind?

A. Yes.

Mr. LILLICK: Q. Looking at the bulge on the port side of the "Silver Palm," indicated on Respondent's Exhibit No. 15, have you any deduction from that as to from which side the force came that caused that bulge on the port side?

Miss PHILLIPS: I renew my objection. Counsel is asking the witness to make inferences as to causes directly against the ruling of the Court.

Mr. LILLICK: I do not understand the ruling of the Court to be anything but that the witness has a right to tell us from which direction that force came, saying nothing about the cause, but from which direction the force came. I understood that to be the court's ruling.

The COURT: He was not giving the angle, but just giving the general direction, in other words, from the standard angle or port angle. [590]

Mr. LILLICK: May I have the question read back?

(Question read by the reporter.)

Miss PHILLIPS: I think that requires going into analysis of the forces.

The COURT: I will allow the question as to whether the force was from the starboard or from the port.

(Testimony of James Barclay.)

Miss PHILLIPS: May I have an exception.

A. The force was from the starboard side.

Mr. LILLICK: Q. Why is that?

A. Because the stem was turned right around and the starboard side was crushed in, whereas the port side was bulged out.

Mr. LILLICK: That is all.

Cross Examination

Miss PHILLIPS: Q. Do you know at what point the "Silver Palm's" bow fetched up at the "Chicago"?

A. Do you mean the amount of penetration?

Q. No, my question is not clear. Do you know the physical object against which the "Silver Palm" struck, that is, the point at which she stopped—have you any idea of what it was?

A. Not definitely.

Q. If the evidence were to show that the "Silver Palm" struck near the forward turret armor plate of the "Chicago", the bow of the "Silver Palm" struck against this tremendously heavy turret almost at the very angle of the turret—Let me show you on Model Exhibit 1. You are to imagine now that this object which I am pointing to is the forward turret of the "Chicago" and that the "Silver Palm" struck against the corner of that turret, this tremendously heavy turret, would that not account for the damage?

A. No, in my opinion I think that the bow of the "Silver Palm" was damaged and was flat when it hit that turret. [591]

(Testimony of James Barelay.)

Q. If the stem of the "Silver Palm" struck the "Chicago" at an angle of 40 degrees, if it had struck right over here, struck the armor plate, with the "Chicago" dead in the water, wouldn't that have thrown the "Silver Palm's" stem to port?

A. No, I do not think so.

Q. You do not think that would explain anything of that sort?

A. No.

Q. Maybe we can illustrate better by a diagram.

The COURT: Might I ask if there is a picture of the starboard side of the "Silver Palm"?

Mr. LILLICK: Yes, your Honor.

Miss PHILLIPS: What I am getting at is this: You are to think of the "Silver Palm's" bow as striking here, fetching up against, you might say, on an angle of a tremendously heavy turret, striking at an angle of approximately 40 degrees. You observe do you not, that in this marked black area the damaged part stops there, do you not?

A. Yes.

Q. This damaged black area represents an exact physical replica in the portion to scale, of course, of the damage to the "Chicago."

A. Yes.

Q. Would you say that the starboard side of the "Silver Palm" hit against this turret?

A. No, in my opinion, no. I think the damage was done before the "Silver Palm's" bow entered so far into the ship.

(Testimony of James Barclay.)

Q. You are just guessing now, aren't you?

Mr. LILLICK: Pardon me, the witness was about to say something else.

Miss PHILLIPS: Go ahead.

A. I am almost certain that the damage would have been done, the whole stem of the "Silver Palm" was practically flattened when it went through the shell, and then it was just a matter of [592] weight pressing it out.

Q. As a matter of fact, you don't know the cause of the pressure inside of the "Chicago," do you?

A. No, I have never been inside.

Q. You have never seen any pictures of it?

A. Oh, yes, I saw a picture.

The COURT: Q. Do you think the angle of impact between these two vessels made by projecting this, the force came this way and struck at that angle so as to have a sliding motion?

A. I do not think so, unless both vessels are moving.

Q. Don't you think that could have caused that damage?

A. To turn that bow to that extent I think both vessels would have to be moving.

Miss PHILLIPS: I am going to show you a couple of photographs here, one of these, the first of them I am showing you, is U. S. Exhibit 3-A, which is the forward end of the "Silver Palm." Do you not agree with me that this little line coming right along here represents the very forward part of the ship at the stem?

(Testimony of James Barclay.)

A. Yes, I think it does.

Q. I am now referring to U. S. Exhibit 3-E, and U. S. Exhibit 3-D. Wouldn't you agree with me that the character of damage shown on these two photographs is substantially the same?

A. In what way do you mean?

Q. Well, looking at it, doesn't it seem to you to look just about the same sort of a general upheaval there, a crushing and smashing? Do you see any substantial difference in those two photographs?

A. Is this the bow of the "Silver Palm"?

Q. I am not telling you. I am asking you to compare these two photographs and asking if you do not agree with me that they do not look to be just about the same as to the damage?

A. No, this one is back of the bow. [593]

Q. Wait a minute, you are now pointing at photograph 3-D. You say this one is back of the bow. Do you think that 3-E is back of the bow?

A. They are both characteristic damage, the same kind of damage.

Q. The same kind of damage?

A. Yes.

Q. If one were to look them over one would say that there was practically no difference?

A. No, I would say they are the same kind of damage.

Miss PHILLIPS: U. S. Exhibit 3-E shows the starboard side of the forecastle of the "Silver Palm" and U. S. Exhibit 3-D shows the port side of the forecastle of the "Silver Palm."

(Testimony of James Barclay.)

Q. You used the term "naval architect." I have heard the term "marine architect." Can you tell me the difference between the two?

A. There is no real difference. A marine architect is a man qualified in the design and construction of all types of ships. A naval architect is the same. The name of "naval architect" is given to the head of the department, of the designing department in the shipyard which constructs vessels.

Q. You do not apply it as being——

A. It is not a degree.

Q. Does either term relate to a commercial ship as contrasted with a man of war?

A. No.

The COURT: A man to be a naval architect must know how to construct a ship?

A. Just the same as an architect is called a building architect.

The COURT: I might call your attention to the fact that I asked about a picture of the "Silver Palm". You were examining the witness and probably did not hear me, but I made of Mr. Lillick the inquiry as to whether he had pictures of the "Silver Palm" on the starboard side, and he handed me these pictures. If there is any objection to my looking at them, I have not looked at them yet.

[594]

Miss PHILLIPS: Have they been introduced in evidence?

(Testimony of James Barclay.)

Mr. LILLICK: The court has not looked at them.

The COURT: I have not looked at them.

Miss PHILLIPS: I imagine if counsel wants to put them in evidence he will do so later.

Redirect Examination

Mr. LILLICK: Q. Mr. Barclay, I hand you Silver Palm Exhibit 3-D, about which you have just been examined, and ask you whether you can tell me from that photograph in which direction the force was applied on the bow of the "Silver Palm"?

A. From the photograph I cannot say.

Q. I hand you a photograph of the "Silver Palm" which is apparently from her starboard bow: can you tell me whether that photograph shows the starboard bow of the "Silver Palm" as you remember it?

A. It does.

Mr. LILLICK: We offer this in evidence as an exemplar of the starboard bow of the "Silver Palm."

The COURT: It will be received as Respondent's Exhibit 16.

(The photograph was marked "Respondent's Exhibit 16.")

Mr. LILLICK: Q. I hand you another photograph and ask you whether you remember the "Silver Palm" in her condition at the time she came in sufficiently to be able to tell me whether that is a photograph of her starboard side?

A. Yes.

(Testimony of James Barclay.)

Mr. LILLICK: We offer that as our next exhibit.

The COURT: It will be received as Respondent's Exhibit 17.

(The photograph was marked "Respondent's Exhibit 17.")

Recross Examination

Miss PHILLIPS: Q. Mr. Barclay, did I understand you to say that the character of the resistance encountered could not have anything to do with the direction of the force—I withdraw that question. I do not think that is a fair question. You [595] have said that there was a bulge on the port side which you did not find on the starboard side.

A. Yes.

Q. That is a fact?

A. That is a fact.

Q. What I am asking you is this, you don't know whether or not there was a variation in the force which the "Silver Palm" encountered, do you?

A. No.

Q. You don't know whether the variation of the force encountered could have caused this bulge, do you?

A. I do not quite understand.

Q. Isn't my question clear?

A. It isn't quite clear.

Miss PHILLIPS: May I have the question read?

(Testimony of James Barclay.)

The COURT: Read the question.

(Question repeated by the reporter.)

A. I think——

Miss PHILLIPS: My question really calls for a yes or no answer. If you want to answer it afterwards or qualify it, by all means do so.

A. May I have the question read again?

The COURT: Read the question.

(Last question repeated by the reporter.)

A. A variation in the direction of force?

Q. No, in the amount of force encountered.

A. No.

Q. You don't know?

A. No.

DAVID W. DICKIE,

Called for the Silver Line, Limited; Sworn.

Mr. LILLICK: Q. What is your age, Mr. Dickie?

A. 65.

Q. What is your present occupation?

A. Engineer and naval architect.

Q. In attaining the position of engineer and naval architect, will you briefly give me your experience and your particular quali- [596] fications?

A. I was brought up in the Union Iron Works here in San Francisco and trained under my father, and at the age of 22½ I became chief draftsman in the naval constructor's office at the building of the

(Testimony of David W. Dickie.)

“Nebraska” by Moran Brothers Company, at Seattle, Washington. I went to Glasgow University to complete my course, taking a post graduate course there in marine engineering, and naval architecture, coming back to this country and working in the shipyards in the East; in 1906, Christmas, I established an office for myself. For three and a half years I was professor of marine engineering and naval architecture at the University of California. I am a member of the Institute of Naval Architects of London, and Northeast Coast Institution of Engineers and Shipbuilders, the Engineers and Shipbuilders of Scotland, the Society of Naval Architects and Marine Engineers in New York. The work that I have done in the last twenty-seven years has included a great deal of collision analysis and mathematics.

Q. During your experience have you ever designed any vessels?

A. Yes.

Q. Can you tell me the yards they have been constructed in?

A. I even went so far as to have my students at the University of California work out the designs of the 300 feet, 350 feet class and the 450 feet class of Shipping Board vessels. I worked on the “Coronia” and “Carmania” on the Atlantic liners, and I worked on the Atlantic Coast vessels at the Fore River Shipbuilding Company and the Newport News Shipbuilding & Dry Dock Company.

(Testimony of David W. Dickie.)

Q. What experience have you had in collision cases with respect to coming to a conclusion as to from which direction forces could result in certain damage?

A. I have been employed on probably 85 per cent. of the collisions that have occurred on the Pacific Coast in the last 27 years, and at the present time I have four such cases in the office, and I have developed as an original work [597] of my own a method of figuring the deceleration, and the time it accelerates, and the angles that occur in a collision that takes place between vessels.

Q. After the arrival of the "Silver Palm" in San Francisco subsequent to her collision with the "Chicago" did you see her?

A. I did.

Q. Where?

A. At Pier 46.

Q. What kind of an examination did you make of her?

A. I made a count of planks in the dock, and using the dock as a base line, using Pier 46 as a base line and Pier 44 as a base line, laid off the angle and made a sketch of the damage of the ship just as she lay in the water alongside of the pier.

Q. Did you at any time go on board of the "Silver Palm"?

A. I have been aboard the "Silver Palm" but I did not go aboard that particular day.

Q. Did you go aboard her later, Mr. Dickie?

(Testimony of David W. Dickie.)

A. Yes, I have been aboard of her later.

Q. Did you make a diagram which shows a plan of the "Silver Palm", with the outline of the bow of the "Silver Palm" as it was after the collision, when she came in to San Francisco?

A. I did.

Q. Have you that plan with you?

A. Yes.

Mr. LILLICK: May it please the Court, and Miss Phillips, I have another witness who is a gentleman I cannot very well keep, and if I may, with the permission of the Court, withdraw Mr. Dickie for a few minutes?

Miss PHILLIPS: Gladly.

The COURT: Very well. [598]

ARTHUR FORSTER,

Called for the Silver Line, Limited, Sworn.

Mr. LILLICK: Q. Mr. Forster, what is your present business?

A. Superintendent of Hull Repairs, Bethlehem Shipbuilding Corporation.

Q. What has been your general experience in the repair of ships?

A. I started in Moran Brothers in Seattle, in 1912, and was with them until the early part of the war, and then with the Albina Machine Shop, in Portland, and from there to the Craig Shipbuild-

(Testimony of Arthur Forster.)

ing Company, and in 1920 I went with the Bethlehem and have been in my present position since 1923.

Q. In your present position, do you have charge of the construction and repair of ships at the Bethlehem Shipbuilding Company, San Francisco?

A. Just hull repairs.

Q. In your employment, there, approximately how many ships would you say you have repaired from damage resulting from collisions with other ships?

A. 25 or 30.

Q. Did you see the "Silver Palm" in the latter part of October or early part of November, 1933, while the vessel was at the yard of the Bethlehem Shipbuilding Corporation for the purpose of effecting repairs arising from the collision with the "Chicago"?

A. I did.

Q. Did you notice the condition of the bow of the "Silver Palm"?

A. I did.

Q. In looking at the bow of the "Silver Palm" at that time and before her repairs, what was the situation with respect to the condition of the stem bar?

A. I would say the stem bar was noticeably to port.

Q. What is the stem bar?

(Testimony of Arthur Forster.)

A. The stem bar is the part really at the foremost part of the ship. It is a heavy steel bar which [599] fastens between the two shell plates of the vessel from port to starboard side.

Q. To put it simply, it is the bar, steel bar, to which on each side the plates of the vessel on the port and starboard bow are fastened?

A. Yes.

Q. By "noticeably to port," what do you mean, how many feet?

A. Five or six feet to port.

Q. What was the situation with respect to the port bow and the starboard bow of the "Silver Palm" immediately behind or aft of the stem bar?

A. Are you referring to the plates?

Q. Yes.

A. I would say the starboard side was crushed and the port side was bulged considerably.

Q. What, if anything, particularly attracted your attention to the fact that the stem bar of the "Silver Palm" was approximately five or six feet to the vessel's port?

A. When we dry dock the vessel it is necessary to center the ship, to set her center on keel blocks, and we use a heavy chain for centering her, and when we hung the heavy chain to center the ship you could see very plainly the stem was five or six feet to port.

(Testimony of Arthur Forster.)

Q. From the examination of the vessel, are you in a position to tell us what caused that bending of the stem bar to the port?

Miss PHILLIPS: That is objected to, the witness has not been shown qualified to answer the question.

Mr. LILLICK: Q. Let me ask you another question: Were there any marks on the stem bar or starboard bow of the "Silver Palm" from which you could draw any conclusion with respect to what had caused the stem bar to be forced over to the left?

Miss PHILLIPS: I will renew the objection. This witness has shown that he is even less qualified than the preceding witness.

Mr. LILLICK: I am asking whether he observed. [600]

Miss PHILLIPS: If you are asking what the witness observed I have no objection.

Mr. LILLICK: Q. Did you observe on the port side of the stem bar, Mr. Forster—What, if anything, did you observe on the starboard side of the stem bar of the "Silver Palm" or the starboard of the "Silver Palm's" bar?

A. On the shell plates it was considerably scratched in places, that is all, scored.

Q. Could you say what those scratches or scores were caused by?

A. I could not.

(Testimony of Arthur Forster.)

Q. Mr. Forster, I hand you Respondent's Silver Palm Exhibit No. 14, and ask you to point out to us where the stem bar is represented on the photograph that was pushed over from five to six feet to port?

A. The stem is flat, as shown at present, it should be originally, I would say just about where the star-board anchor is shown here now.

Q. Might I ask you on the photograph with my pen to indicate the position you have just pointed to, drawing a line out in the white portion of the photograph?

A. I would say the stem came right down through there.

Q. Will you mark that with an "A", please?

A. Yes.

Q. "A" indicates where the stem's original position would be on the "Silver Palm"?

A. Yes.

Q. Now with my pen and a similar line mark "B" indicating to what point the stem bow was forced over, as you say?

A. You can see it here in the picture, here is your stem bar.

Q. Will you draw out into the white portion and mark that with a "B"?

A. Yes.

Q. I show you "Silver Palm" Exhibit No. 15 and ask you what, if anything, the bulge on the port side of the "Silver Palm" indicates?

(Testimony of Arthur Forster.)

Miss PHILLIPS: Just a moment, it is objected to as calling [601] for the conclusion of the witness as to cause, as to which he has not been shown to be qualified to answer.

Mr. LILLICK: Q. Mr. Forster, from your examination of the "Silver Palm" when she was at the Bethlehem Works, did you see that bulge represented on the photograph in that exhibit?

A. Yes.

Q. Can you tell me from which direction with the keel of the "Silver Palm" as the axis the force came that resulted in that bulge?

A. I do not think so.

Q. I beg your pardon?

A. I do not think I could.

Mr. LILLICK: That is all.

Cross Examination

Miss PHILLIPS: Q. Mr. Forster, I *would to* show you two photographs. I am now referring to U. S. Exhibit 3-E and U. S. Exhibit 3-D. These pictures show substantially the same kind of damage, do they not?

A. Yes, they do.

Q. From your experience in ship repairing, metals do not turn or twist uniformly, do they?

A. No, some break, and some turn, and twist.

Q. It is also true that metals, themselves, may vary a good deal under different kinds of stresses, may they not?

A. True.

(Testimony of Arthur Forster.)

Q. Some forces could cause a piece of metal both to twist—I withdraw that. A stem bar bent as you have shown in that picture would not necessarily be of a uniform piece of metal, would it, in itself?

A. I would say any particular stem bar out of the same rolling would be fairly uniform.

Q. Fairly uniform?

A. Yes. You might find one stem bar that will bend considerably and another one may come along and it may be too hard to bend and break before it bent so much.

Q. There would not be any uniform yielding of the metal in any particular way?

Mr. LILLICK: Might I ask, Miss Phillips, what you mean by [602] “uniform”?

Miss PHILLIPS: I think I have gone far enough, I think counsel’s objection is well taken. That is all.

DAVID W. DICKIE,

Direct Examination (resumed).

Mr. LILLICK: We offer the plan just identified by Mr. Dickie as our exhibit next in order.

The COURT: It will be received as Respondent’s Exhibit No. 18 in evidence.

(The document was marked “Respondent’s Exhibit 18.”)

(Testimony of David W. Dickie.)

Mr. LILLICK: Q. Mr. Dickie, will you explain that plan to us, please? Tell us what it indicates. Lay it on the court's desk.

A. This plan was made from the sketch which I made down at Pier 46 when the vessel came in after the collision, and I used as the basis to get the plan accurate the drawings of the ship which I got from Captain Ensor. The two inside drawings represent, or the two inside lines running from frame 139 to the bow of the ship represent a plan view of the third deck. The next two lines immediately outside of the first two lines represent a plan view of the second deck. The two outside lines represent a plan of the upper deck and the short part of the drawing which extends from frame 157 forward to the bow represents a plan of the forecastle deck. The short lines that are at each side of the third deck and the forecastle deck represent the frames of the ship which run from the keel around the side of the ship inside of the outside plating, or the skin of the ship up to the top. There is a space of 32 inches aft of frame 139, there is a space of 27 inches between 139 and 166, and there is a space of 24 inches from 166 forward to the stem. It was these frame lines, the rivets of which [603] show on the outside of the ship, and show in the photograph which I had this morning, that enable me to make my sketch because the side of the ship show where the rivet heads had pulled at intervals of 24 inches along on the outside of the plating. The

(Testimony of David W. Dickie.)

damaged part of the ship extended from frame 166 or the collision bulkhead forward and the particular sketch which I have drawn in lead pencil was taken at about the level of the second deck. The bulge is greatest on the port side and extends forward to frame 173, when there is a fold like an accordion pleating which extends aft to starboard, and then at frame 174 there is another bulge which extends forward to frame 175. Then there is another fold which extends aft and to the starboard, and ahead of that between frame 175 and 176. There is another bulge to which the stem is attached.

Q. Might I interrupt you a moment and ask you to identify, if you can, upon Government's Exhibit 3-B the bulges which you have indicated upon your diagram, if you can?

A. The first bulge that extends from frame 166 to frame 173 is obscured by the freight handling gear, so that I am unable to locate frame 166, but I will locate the first bulge and mark it A.

Q. Will you mark upon your plan "Bulge A" so that the photograph and the plan will agree?

A. Yes. I have marked on the photograph "B" "C" and "D" and I am marking the drawing with "B", "C", and "D".

Q. Now, will you continue?

A. On the starboard side the damage on the ship showed a slight bulge which extends from frame 166 forward to frame 171, and then the dam-

(Testimony of David W. Dickie.)

age extends in a circular form in toward the center of the ship, and coming back to about frame 170, and then passing from frame 170 forward in a wiggly line frame 176, where it joins the stem on the starboard side. That describes the damage as shown on the plan.

Q. Will you, from your plan, tell me whether you can tell us from [604] which direction the forces came that caused the damage as indicated?

A. The direction came from the starboard side of the "Silver Palm" and passed toward her port side, at an angle less than 90 degrees through the center line.

Can you give me any explanation of why at the very stem of the damaged portion the stem of the "Silver Palm" seems to be turned to starboard, if that be the stem—what is that?

A. That is the stem, and the reason that it appears that way at that particular place was on account of the drawing of the plate on the starboard side which was formerly in line, which was almost straight from frame 166 to the stem. That length of plating was drawn into and is opposite the bulge so that the plate was shortened, and in the shortening of the plate the stem was inclined to turn to the right, to the starboard, and then the stem of the "Silver Palm" passed inside the collision of the "Chicago" and was no longer affected thereby.

Q. Do you know whether the stem shown here from a view above was broken below the point?

A. It was, yes.

(Testimony of David W. Dickie.)

Q. Which way was her stem bar, if that is the stem bar, turned or canted?

A. The whole bar was canted to port, thrown over to port bodily, and the stem bar below was crushed.

Q. Have you a photograph, Mr. Dickie, showing the "Silver Palm" from a stem view?

A. It is in your brief case, there.

Q. I hand you what purports to be a photograph from forward of the stem of the "Silver Palm". Do you know whether that photograph that I have just handed you is accurate and correct relative to the condition of the "Silver Palm" after the collision and before she was repaired?

A. That is the condition the "Silver Palm" was in when I saw it at Pier 46. Of course, part of that was below the water line when I saw her at Pier 46. [605]

Mr. LILLICK: We offer this as our next exhibit.

The COURT: It will be received as Respondent's Exhibit No. 19.

(The photograph was marked Respondent's Exhibit 19.)

Mr. LILLICK: Q. Will you explain this photograph in relation to your plan and tell me what the situation is with reference to the stem, and how it was affected by the collision?

A. When the "Silver Palm" appeared at Pier 46 the water line was down about where I have

(Testimony of David W. Dickie.)

marked with an arrow "W.L." The water line changed on the ship for the reason that they were taking cargo out of the ship all the time so that this merely represents the water line at one particular time. The section that I have shown on my drawing with a red line is taken where I have marked "2-D," and what means the second depth, and there is shown in this photograph a row of rivets which followed from the point of my arrow clear across the photograph and came out on the starboard side.

Q. Can you indicate those in any way?

A. Yes, I have indicated them on each side with "2-D" on the starboard side and on the port side "2-D"; the row of rivets that are torn by the damage is clearly shown in the photograph. I have also marked on this photograph the center line which extends from the center of the keel block at the bottom up to where the stem originally was on the ship.

Q. Will you mark that line "ZX," please?

A. I have marked the line "ZX". The way I located the top of this line is I first located the port light which I have marked with an arrow as between frames 169 and 170 on the starboard side and 169 and 170 on the port side. These port lights I am marking on my drawing with an oval mark at the level of the forecastle deck, and I am writing "Port lights." These port lights are opposite each other at corresponding positions on the ship, and I

(Testimony of David W. Dickie.)

took half the distance between these port lights to determine the position of the center line where it pass- [606] es through the fluke of the anchor, that is to say, the starboard anchor of the "Silver Palm." My first impression in looking at this damage of the "Silver Palm" was that the "Silver Palm" was still in the water and that the other ship which was in collision with her had passed from the "Silver Palm's" port to her starboard, and had carried the entire structure of the bow over to the port side of the "Silver Palm."

Q. I beg your pardon, Mr. Dickie, you have just stated that your first impression was that it moved from port to starboard.

A. No, starboard to port. That was a mistake.

Q. You said port to starboard?

A. My first impression was that the vessel, that the "Silver Palm" was still and that the vessel with which she had been in collision had come at her from the starboard side and had pushed the bow over toward the port side and caused all the damage. That impression was confirmed by the position of the starboard anchor on the "Silver Palm" which was driven into the hull of the ship, whereas the anchor on the other side was moved toward the port. The stem of the "Silver Palm" was 4.7 feet pushed over to port and the three folds immediately aft of the stem indicated to me that the material which formerly had extended almost in a straight line from frame 166 to the stem was

(Testimony of David W. Dickie.)

folded up like an accordion pleating to dispose of the length of the plates from frame 166 to the stem.

Q. Did you find that that stem bar was broken?

A. Yes.

Q. Where?

A. The stem bar was broken at about the sixth plate lap down from the forecastle deck.

Q. Your plan as drawn indicates the stern bar pointing to the starboard side of the "Silver Palm."

A. Yes.

Q. How far down did that stem bar point in that direction before there was a break?

A. The stem bar pointed in the direction that I have shown it from about the second plate lap from the top down [607] to about the fifth plate lap, and from the fifth plate lap to the sixth plate lap the direction of the pointing of the stem was more or less confused, due to the crumpling of the material.

Q. What happened to the stem bar above the second plate?

A. It was so badly crushed up in the mess that it was difficult to form an opinion of what became of it.

Q. Did you see the "Chicago" after the collision?

A. No, I did not.

Q. I show you U. S. Exhibit 2-M, with the gash made in the side of the "Chicago," and calling your attention to the forward portion of the cut, ask you

(Testimony of David W. Dickie.)

to tell me whether in comparing the forward line of the cut to the after portion of the cut you can tell us whether the "Chicago" was in motion at the time that that cut was made?

A. Yes, she was in motion.

Q. Why?

A. Because the plating which covers the side of the "Chicago" is torn from the forward side of the gash, and all of the intervening material between the forward part of the gash and the after side of the gash is crumpled up into a bunch at the after side.

Q. I show you U. S. Exhibit 2-D, and call your attention to the after end of the cut in that photograph, and ask you whether you can tell me whether there is any indication from it of whether the "Chicago" was moving at the time the two vessels came into contact?

A. The "Chicago" was moving at the time the two vessels came into contact.

Q. In which direction?

A. The "Chicago" was moving toward the left side of the "Silver Palm," that is, toward her bow, and this crushed material that shows in the after part of the photograph U. S. Exhibit 2-D was the material that was stowed in the cut on the starboard side of the "Silver Palm."

Q. Will you explain to the Court from this photograph how you know that the "Chicago" was going ahead at the time of impact? [608]

(Testimony of David W. Dickie.)

A. The reason that this photograph shows that the "Chicago" was going ahead is that the deck of the "Chicago" at the left-hand side of the picture where the flare of the vessel is shows all along that it was torn and drawn as the vessel moved ahead. The edge of the plate shows where it is rubbed, and down at the bottom there is a piece of plating which was not torn away, but was pointed in a fore-and-aft line, in contradistinction to the side of the vessel, which is not in a fore-and-aft line, but is in a line which is at an angle to the center line of the ship, the same as every ship is built. It will be noted on this plate which I am marking with an "S" that the paint on the plate is scraped where the plate came in contact with some *obstruction*, such as might be represented by the lower part of the stem of the "Silver Palm," and the paint is scratched off and the material of the decks, and all of the internal structure is moved aft and pulled up at the after end of the *of the* cut, toward the right side of the photograph, indicating that the vessel was moving in the direction that the guns are pointed.

Q. What, if any, explanation is there of what we have termed the accordion pleating at the after end of the gash in the "Chicago"?

A. The *according* pleating formed itself there because it was imprisoned in the space which I am marking with the black pencil on the drawing of

(Testimony of David W. Dickie.)

the "Silver Palm" on the starboard side of the gash in the bow of the "Silver Palm."

Q. Will you mark that pencil identification with a "D. W."?

A. Yes.

Q. Is there any confirmation of what you have just shown us on Respondent's Exhibit 19, the bow picture of the "Silver Palm"?

A. Yes. All of the material between the upper part of the ship down to the plate lap No. 6 indicates quite clearly the space on the starboard side which is represented by the mark "D.W." on my plan, where this crumpled material is stowed. Then another thing [609] that indicates that the vessel was moving ahead is the fold in the plate of the "Chicago" which extends outboard—it shows better on Government's Exhibit 2-M under the word "Mare" of "Mare Island." It will be noticed that the fold of the plate extends outboard and then inboard, forming a fold which would have been turned in the other way if this damage had been caused by an object pressing from the side of the "Chicago" toward the center of the "Chicago."

Q. Could the result that is evidenced by this photograph have occurred by reason of the "Silver Palm" approaching the "Chicago" and striking her on approximately a 40-degree angle at a rate of speed anywhere between 8 and 10 knots per hour and her coming in contact with the "Chicago" if the "Chicago" had been at rest in the water?

A. No.

(Testimony of David W. Dickie.)

Q. What, in your opinion, is the explanation of the fact that on the "Chicago" the folds in the rear of the cut and the sharp cut in the forward part of it occurred?

A. My explanation is that the "Chicago" was going ahead at quite a substantial rate of speed.

The COURT: What would you call "quite a substantial rate of speed"?

A. About between 6 and 7 knots. The ordinary collisions that have taken place on the Coast, here, the impact has usually taken place in the neighborhood of 1 knot, and the vessel that inflicts the damage has usually not been injured as badly as the "Silver Palm" was injured in this case.

Q. What would you estimate the "Silver Palm" was going?

A. I would say the "Silver Palm" was going about between 5 and 6 knots.

Mr. LILLICK: Q. Mr. Dickie, we have had some testimony with respect to tests made by a professor of the University of California, using these two models which are on the desk, and to which [610] I am pointing. The one which is marked "Golden Boats" is a model that was used as a model of the "Silver Palm" and the other with the rods in the center is the model that was used for the "Chicago". The testimony was in effect that the model used for the "Silver Palm" was in a swimming pool with a string at a ring upon its stem at a distance of

(Testimony of David W. Dickie.)

approximately twenty feet from the model of the "Chicago," and that these gentlemen attained a speed upon the part of the model of the "Silver Palm" which they testified with the relative proportions of these vessels in comparison with the "Silver Palm" and the "Chicago" amounted, when the "Silver Palm" model struck the model of the "Chicago" to a speed of 12 knots an hour, and that on another test that they made the "Chicago" was pulled through the water on a similar string and by a similar method, but only a few feet away from the man who pulled the model of the "Chicago" through the water; that when they struck at any speed which was around about 6 knots per hour on the part of the "Chicago" and 12 knots per hour on the part of the "Silver Palm", with an angle of 40 degrees between them, that the two vessels would strike and sideswipe and end in a position with the bow of the "Silver Palm" in the opposite direction to that of the bow of the "Chicago" and approximately parallel. With an experiment performed like that as indicated by those two gentlemen, with models of this type, would such a test be, in your opinion, accurate as to its result if the vessels, themselves, were at sea?

Miss PHILLIPS: Your Honor, may I make the objection that the witness has not been shown to have any knowledge or experience with model ship tests.

(Testimony of David W. Dickie.)

Mr. LILLICK: Q. Have you ever had any experience with model tests?

A. Part of my training at the University of Glasgow was that we were taken to Denny Bros. tank where they make the [611] same tests that they make in the tank at Washington, and I likewise was taken to the tank in Germany at the Hofschuler, where they had a very elaborate tank, and I have seen model tests made in both of those places, properly made, where the models were made exactly to the shape of the ship and the results had some bearing and relation to the ship after she was completed.

Miss PHILLIPS: I believe I have a right to ask a question.

Q. Mr. Dickie, when were you in Glasgow?

A. I think it was either 1903 or 1904, or 1904 or 1905.

Q. When did you see these model tests done?

A. In 1903, or it was in that time that I saw the model tests made in the tanks at Dumbarton.

Q. Dumbarton, Scotland?

A. Yes, and I likewise saw one in an English tank, and a German tank, but they were not all in the same year.

Q. Can you give me an idea of the approximate date?

A. I would have to look up the college curriculum to get the exact date.

(Testimony of David W. Dickie.)

Q. I do not wish the exact date, I said approximately.

A. Well, 1903, 1904, along in there.

Q. Did you perform any of those tests yourself?

A. No, the assistant professor at the University of Glasgow performed the experiment for the benefit of the students, and we were free to ask questions and study the thing.

Q. Might I ask if you were a student at the Glasgow University at that time?

A. Yes, I was.

Q. In what year?

A. In the junior and senior years.

Q. Will you tell me how old you were, in reasonable limits?

A. I was about 24 or 25, somewhere along in there.

Q. What experience in performing ship model tests since that date have you had?

A. My experience in ship models is confined to the work that I did with small boats in the bay, here, designing [612] small boats from 14 feet up to 25 or 30 feet, and putting power in them.

Q. You misunderstood my question, I probably did not make it clear enough. I asked you what experience you had in conducting ship model tests?

A. I have had no experience in conducting ship model tests in a tank, what we call an experimental

(Testimony of David W. Dickie.)

tank, outside of the tank at Denny's, Dunbarton, and the tank in England and the tank in the German school.

Q. That was at the approximate time you have stated?

A. Yes.

Q. When you say the professor conducted these tests?

A. And the staff at the tank.

Q. How long were you at Germany when you saw the ship model test there?

A. About two days we were down at the high school as the guest of the Naval Architects Society.

Q. You were the guest of the Naval Architects Society?

A. Yes.

Q. You just went down to see the tank, or see the test there?

A. Just for that purpose.

Q. They were doing some tests?

A. Yes, elaborate tests.

Q. In England, you saw it there?

A. The German tank was the best at that time, they had glass sides on the tank and you could view it from the top, sides and bottom.

Q. You mentioned three tanks that you were acquainted with, that had ship model tests, one in Scotland, one in England, and one in Germany. What was your experience at the tank in England?

A. The same thing, we were the guests of the

(Testimony of David W. Dickie.)

Shipyards there to see tanks being used and tests made and results taken.

Q. You have had no experience in any of the three of them, nor were you charged with any responsibility in conducting them?

A. No, I was not charged with any responsibility. I was present, being instructed with respect to the testing of ship models in the tank. [613]

Q. Have you ever been to the Washington ship model testing tank?

A. No, I have never had the pleasure.

Q. By the way, what was the size of these tanks you have referred to?

A. I think the one at Dumbarton was about 250 or 300 feet long, and I think the biggest one was the German tank. It was a little smaller than the present tank at Washington.

Q. What kind of tests did you witness at these tanks?

A. I witnessed a test of a model being towed with a towing machine, a test of a model being operated with a propeller that was driven by another machine that followed after the ship. That is about the simplest explanation that I could give of that.

Q. I would like to get at the purpose of the tests that you saw that were being made.

A. The purpose of the test was to give a criterion upon which to base the speed and horsepower of a final ship that was to be built from the model that was being tested.

(Testimony of David W. Dickie.)

Q. What was the date of the last ship model test that you have ever seen?

A. The date I have given you.

Q. The dates you gave me?

A. Yes.

Q. Have you had any experience in the conducting of aeroplane tests, model aeroplane tests?

A. No, the only aeroplane laboratory that I have seen is down at Palo Alto.

Q. You have had no experience in seeing tests there?

A. Yes, I saw them make a test of the aeroplane—I went down there as the guest of Domonosky, and they put the aeroplane in the machine and ran the test for me. I was a guest there, during the whole time they were running it. In fact, it was run for my pleasure.

Q. They are a high speed test, are they not?

A. Aeroplane mathematics are the same as marine mathematics.

Q. As I understand you, the aeroplane test is a more highly com- [614] plicated test than the ship test?

A. No, I would not say it is more complicated.

Miss PHILLIPS: Your Honor, my objection that the witness is not qualified to answer the question put to him is renewed.

The COURT: Q. You have made a study of that particular line of work?

A. I have, yes.

(Testimony of David W. Dickie.)

Q. You have outside of this?

A. I have done a great deal of theoretical work along that very line; I have done theoretical work and then had the opportunity to build a small boat upon which I could make complete full-sized tests to compare with my theoretical work.

Q. Those were tests as to speed?

A. Speed, and horsepower, and turning, and all that sort of thing.

Q. Did you make it as far as damage from collision was concerned, as to what might happen as to movements?

A. Yes, I have made tests as far as stopping a vessel in a particular time and taking the time and the distance.

Q. As far as collisions are concerned, as to the way a ship drifts or acts after having a collision?

A. Yes, I have done it on full-sized ships.

Miss PHILLIPS: Q. You mean you have run ships through a collision?

A. Yes.

Q. You mean you actually ran the ship so as to make it collide with another vessel?

A. No, please don't misunderstand me. What I mean is this—

Q. I thought your answer to the Court's question so indicated.

A. What I did say was this, I took a full-sized ship and ran her up to the full speed that she would go. I then shut the engines off and reversed her and

(Testimony of David W. Dickie.)

I measured the time and the distance that it would take for her to stop, and then, previous to that time, [615] I had made all of the calculations and delivered them to the Standard Oil Company; the Standard Oil Company wanted to use them on another ship, and they conducted or at least invited me along as a guest conductor, to conduct this test in particular that I am speaking about, and I came within one second of the time that the vessel stopped.

The COURT: Of course, that particular knowledge might pertain to certain phases of the testimony given here in regard to the signals given and the force brought to bear for the purpose of slowing up or controlling the speed of the two ships, but the question that I am asking is more pertinent than that. This test was not for the purpose of testing out the speed, primarily it was intended to test out two objects of certain relative weights in the form of ships which struck one another at a certain angle, what would happen with regard to those two ships; the question is, have you conducted investigation, either from study or from actual experience in connection with models or ships whereby if they strike at certain angles, taking for granted that they had certain speeds, as to just what way they would turn? Do you feel that you have studied that?

A. I feel that I have studied that question, and those models——

(Testimony of David W. Dickie.)

Miss PHILLIPS: Just a moment, the witness wants to testify.

The COURT: I have no objection to your further going into the question, but what he testifies is that he feels his studies have qualified him, even though he has not actually reproduced a collision, by maneuvering a ship.

A. I have not reproduced a collision by maneuvering the ship. The collisions that I have reproduced have all been in big ships. I have observed all of the conditions on the big ships after the collision had taken place. I have not been present at an actual [616] collision.

Miss PHILLIPS: What I am getting at is the witness' experience in a highly involved and technical study of ship model tests, and I am trying to get at whether he has ever studied such tests and what his experience is.

The COURT: Do you feel that you can compare the knowledge you have as against tests of that kind?

A. I would sooner base my conclusion upon my studies than any test that was made.

Q. I am not trying to ask you whether you feel that you are in a position to criticise the tests. I am asking you if you feel that you can compare the knowledge that you have as against a test of that kind. That is the point.

A. Yes.

(Testimony of David W. Dickie.)

The COURT: We have now reached a point of adjournment. If I decide that I will permit him to answer, how much longer do you think the trial will take?

Mr. LILLICK: I think Mr. Dickie is the last witness. We might have one more witness to testify with respect to what he saw of the "Silver Palm's" condition after the collision, and that will conclude our case.

The COURT: I imagine if Mr. Dickie is finally decided by the Court to be qualified to answer cross-examination will result from that. How much longer do you think it will take, at least half a day?

Mr. LILLICK: It will depend upon *Mrs.* Phillips' cross-examination of Mr. Dickie, which may be protracted. (After discussion)

The COURT: I would rather give you a day for it. In other words, I would rather have this case concluded, with the exception that I will draw a jury in the morning, which will probably take three-quarters of an hour, and then we will proceed. We will take an adjournment now until Tuesday, at ten o'clock a.m. [617]

(An adjournment was here taken until Tuesday, March 27, 1934, at ten o'clock a.m.)

Filed June 19, 1934. [618]

Tuesday, March 27, 1934.

DAVID W. DICKIE,

Direct Examination (resumed).

Mr. LILLICK: May it please the Court, at the conclusion of the last day's hearing in this matter there was under submission an argument with respect to the admissibility of a question that I had propounded to Mr. Dickie, and it is quite impossible for me to remember the phraseology of the question, so if I may read the question from the last day's proceedings I will do it.

The COURT: I know the substance of it.

Mr. LILLICK: Q. The question was:

"Q. Mr. Dickie, we have had some testimony with respect to tests made by a professor of the University of California, using these two models which are on the desk, and to which I am pointing. The one which is marked "Golden Boats" is a model that was used as a model of the "Silver Palm" and the other with the rods in the center is the model that was used for the "Chicago." The testimony was in effect that the model used for the "Silver Palm" was in a swimming pool with a string at a ring upon its stem at a distance of approximately twenty feet from the model of the "Chicago," and that these gentlemen attained a speed upon the part of the model of the "Silver Palm" which they testified with the relative proportions of these vessels in comparison with the "Silver Palm" and the "Chicago" amounted, when the

(Testimony of David W. Dickie.)

“Silver Palm” model struck the model of the “Chicago” to a speed of 12 knots an hour, and that on another test that they made the “Chicago” was pulled through the water on a similar string and by a similar method, but only a few feet away from the man who pulled the model of the “Chicago” through the water; that when they struck at any speed which was around about 6 knots per hour on the part of the [619] “Chicago” and 12 knots per hour on the part of the “Silver Palm,” with an angle of 40 degrees between them, that the two vessels would strike and sideswipe and end in a position with the bow of the “Silver Palm” in the opposite direction to that of the bow of the “Chicago” and approximately parallel. With an experiment performed like that as indicated by those two gentlemen, with models of this type, would such a test be, in your opinion, accurate as to its result if the vessels, themselves, were at sea?”

Miss PHILLIPS: Your Honor will recall that to that question I made the objection that the witness had not been shown to be qualified in the performance of model ship tests, or any knowledge of model ship tests, and a cross-examination was conducted thereafter into his experience with model ship tests, and I believe at the time the Court adjourned, at that stage of the proceedings. Might I also point out that the witness has not been shown to be qualified in the maneuvers of vessels at sea?

Mr. LILLICK: If your Honor please, the tests

(Testimony of David W. Dickie.)

were made by gentlemen who, in my humble opinion, lacked so many qualities that Mr. Dickie has in comparison between their respective experiences, and so flattering to Mr. Dickie, that if the experiments made by these two gentlemen were of any validity at all Mr. Dickie's testimony with respect to it is entitled to so much more respect than theirs, and by comparison the qualifications of the two gentlemen who made the tests are so disparaged to the qualifications of Mr. Dickie that it seems almost unnecessary to argue that Mr. Dickie has already shown by the rigorous cross-examination by Miss Phillips, and by the questions propounded by the Court, to be certainly able to give us an opinion that should be entitled to at least some weight by the Court. [620]

Miss PHILLIPS: My suggestion was not as to the comparison of the qualifications of the two sets of witnesses, my suggestion was that the witness had not been shown to have been qualified in ship model tests, and that Mr. Dickie was asked to make a criticism of the ship model tests with vessels at sea, when he has not had any experience in it. The last part of the question was that the witness should make a comparison between the ship model tests and vessels at sea, the maneuvers of vessels at sea. I do not think counsel has asked him any questions at all to show Mr. Dickie's experience in maneuvering vessels at sea.

(Testimony of David W. Dickie.)

Mr. LILLICK: Addressing myself to that last part, the other gentlemen never even saw the result of the collision, and they were not testifying from the standpoint of what would happen with respect to maneuverability, they were testifying with respect to what would happen if the vessels struck one another.

Miss PHILLIPS: He is asking this witness to compare a ship model test with vessels maneuvered at sea when he is shown to have no experience or qualifications in the maneuvering of vessels at sea. He has not shown he has had any experience in that. He has not been asked any questions about the maneuverability of vessels at sea. I did not pretend to qualify my witnesses upon the maneuverability of ships at sea, and counsel is endeavoring to qualify his witness on both scores.

Mr. LILLICK: I am not attempting to qualify him, and have not attempted to qualify him on the question of maneuverability of ships at sea, but I do say to the Court in all seriousness, whatever point there may be in Miss Phillips' objection to the question propounded, it is an objection that may run to the weight of this witness' testimony, but certainly not as to its admissibility. I submit the objection.

The COURT: Of course, the situation here is the witness, him- [621] self does not claim to have made any model tests or be familiar in the true sense with what would result from certain model tests,

(Testimony of David W. Dickie.)

but what he does believe is, he has made a study of collisions as between vessels, full-sized vessels in collisions, and knows something about their conduct under crash conditions, and feels that by use of his scientific knowledge he can predict as to whether the performance of models would conform to the situation at sea. Am I correct in that?

A. Yes.

Q. That is your point?

A. Yes.

The COURT: I am inclined to believe that it does go to the matter of weight of his testimony rather than it would not be admissible at all, because if he can show by his testimony that there is no comparison between the two from a scientific standpoint, I believe he has a right to express himself, even though he has not actually seen the ships in contact. You may answer.

Miss PHILLIPS: May I have an exception to the Court's ruling, and, to save time, I would like not to have to repeat the objection to each question asked, but may I have an exception to the testimony of the witness running along as to his criticism upon the ship model tests testified to by Professor Woods and Professor Vogt.

The COURT: You may have that objection to the testimony.

Mr. LILLICK: There is no objection to that, except as the objection may be limited, if Miss Phillips will be good enough to state when during

(Testimony of David W. Dickie.)

the course of the examination of Mr. Dickie she feels that the objection that she is now asking be applicable to the following questions shall end.

Miss PHILLIPS: I think we will understand each other. I do not mean that there is a blanket objection to everything the witness can testify to.

The COURT: I do not know of any question that is going to be [622] asked by Mr. Lillick, but I will say that to the general question the Court just permitted of the witness, I imagine that would cover the entire phase, and he would be able to make the statement as to whether he had covered the subject.

Mr. LILLICK: I have no objection to that. Mr. Dickie, will you answer the question propounded—perhaps we could have the end of that question repeated. May the Reporter read the very end of it?

Mr. McWILLIAMS: I have the transcript here, and the last of it is: “With an experiment performed like that, as indicated by those two gentlemen, with models of this type, would such a test be, in your opinion, accurate as to its result if the vessels, themselves, were at sea?”

The COURT: Of course, it would be as to the general effect, rather than accurate as to its result of an accident to two vessels at sea. Of course, we will assume at the start that he could not accurately say—the word “accurate” is used in a comparative sense. The question is, What is likely to occur under those dynamics?

(Testimony of David W. Dickie.)

A. The tests between the two models on the table would not be representative of performances of the "Silver Palm" and the "Chicago," for the reason that the fundamental law governing the action of models with respect to ships which they are purporting to represent requires that the models be similar, that is to say, the length, breadth and the draft of each model must be similar, must be exactly the same as the ships that they purport to represent. That being true, the law known as Froude's Law applies to the tests a certain factor; the dimensions are related to each other, the wetted surface is proportional to the square of the linear dimensions, and the horsepower is 3.5 to the linear dimensions, etc. So that unless these [623] models were exactly the same as models of the ship, any test that was made with them would not be a fair representation of what would take place.

Q. Comparing a string with a propeller as a means of propulsion on a model, how, if at all, would the result vary?

A. The result between the application of the power to the model by means of the string and application of power to the model by means of having a propeller at its stern is entirely different, because the propeller has an action on the ship, and the ship has an action on the propeller; one is called the augmentation and the other is called the thrust deduction. With the use of the string, the

(Testimony of David W. Dickie.)

performance of the models is changed, due to the total lack of having a propeller present.

Q. Is that without taking into consideration whether the string was dropped in the water after the initial momentum was given to the model?

A. That would make no difference, no matter what happened to the string, the fundamental difference in trust deduction and the augmentation is entirely absent by the use of string.

Q. What would you say as to the effect upon the momentum of the model if the string, itself, were dropped in the water and was thereafter a drag on the model, would that affect it in any way?

A. That would slow up the speed of the model.

Q. The model used for the "Chicago" was a model which Professor Woods testified was 49 inches long, the model I am showing you, and the testimony shows that the "Chicago" was 572 feet at the water line. Will you give me what that ratio is?

A. That is 140 to 1.

Q. With the "Chicago" model that I show you, 49 inches long, and the "Chicago," herself, with a length of 600 feet over all, what would that ratio be?

A. That is 147 to 1.

Q. The testimony shows that the model used for the "Silver Palm", [624] the one I show you, was 40 inches long, and the "Silver Palm," according to the testimony, was 400 feet at the water line. What is that ratio?

A. That is 135 to 1.

(Testimony of David W. Dickie.)

Q. With the "Silver Palm" model 40 inches and the testimony showing her to be 475 feet over all, what is that ratio?

A. That is 142½ to 1.

Q. Assuming, Mr. Dickie, that the ratio used by the gentlemen who performed the tests to which they testified was 150 to 1, what have you to say as to the variation there would be in errors that might have been committed in effecting the tests if the ratio of 150 to 1 was carried out?

A. There would be an error in power applied to the string higher than any propeller error in relation to the square of 150 to the square of 140 and 135.

Q. Would or would not an error of any character mean in the computation by the gentlemen who performed these tests, using the models at a ratio of 150 to 1—would that error be either magnified or would it be increased or decreased in any comparison with the ratio of 150 to 1?

A. The use of a ratio of 150 to 1 in his figures in place of the ratio of 140 or 135 to 1 would be an increase in the error in the proportion of the square of those numbers.

Q. We have no testimony with respect to the computations made by the gentlemen who made these tests with respect to the breadth of the two models. Looking at the models before you, and their comparable breadth, what would you say as to the result of tests made by the use of these models in com-

(Testimony of David W. Dickie.)

parison to the actual performance of the "Chicago" and the "Silver Palm" at sea?

A. With the "Chicago" model the relation of the beam to the length is about 5.6 to 1. In the "Silver Palm" model the relationship is approximately 4.95 to 1. The relationship between the length and the beam of the "Chicago" is approximately 8.7 to 1. The relationship between the length and the beam of the "Silver Palm" [625] is approximately 7.4 to 1. This discrepancy between the relationship of the beam to the length of the model as compared with the actual ships that they were made to represent would make any deductions that might be drawn from the form of the models inapplicable to the ships, themselves, whether in the bay or at sea.

Q. I call your attention to a strip along the keel of the model of the "Silver Palm" which Professor Woods testified was, with the proportions used by him on the "Silver Palm", what would represent a three-foot false keel running from stem to stern of the "Silver Palm". What, if any, effect would that false keel have had with the rudder or any test that would make an error in the test due to increased displacement or increase in wetted surface?

A. The keel that is put on the model and which is not present on the "Silver Palm" would add to the wetted surface of the model over and above the wetted surface of the "Silver Palm," and would

(Testimony of David W. Dickie.)

add to the displacement of the model over and above the displacement of the "Silver Palm," so that there would be an error in that test due to the presence of that keel.

Q. I call your attention to three projections upon the keel of the model used for the "Chicago," which Professor Woods testified in relative dimensions would have meant that each projection was 12 feet in length and 6 feet in width. What, if any, difference in the tests made by the use of that model would those projections make?

A. There would be some error due to the wetted surface of those projections, but the principal error would be due to the eddy formation caused by the projections on the bottom of the vessel.

Q. Would either of the projections upon the bottom of those two vessels, the false keel upon the model of the "Silver Palm," and the three projections upon the model of the "Chicago" have [626] had any effect, whatever, if the vessels, themselves, at sea, had similar false keels or projections upon their surface in relation to their movements after the collision?

A. If the vessels, themselves, had projections of that type, it would still be questionable whether the projections on the large vessel would act just exactly the same as they would on the models.

Q. Mr. Dickie, I show you Government's Exhibits 9-A and 9-B, indicating the position of the two vessels after the impact, as testified to by Pro-

(Testimony of David W. Dickie.)

fessor Woods and Professor Vogt, between the models, with the "Chicago" either at rest or moving ahead or astern at not more than one knot, and the "Silver Palm" striking her at a speed of 12 knots, and will ask you whether it is even possible with such a collision between the two vessels at sea they could have ended in the position indicated on the diagram without some action upon their propellers?

Miss PHILLIPS: It is understood my objection still goes to the line of testimony, and I will add the further objection that this witness is not shown to have made any study or to be qualified in the field of dynamics.

Mr. LILLICK: This is a common sense knowledge, not even a knowledge of dynamics. I will submit the objection.

Miss PHILLIPS: This witness is supposed to be testifying as a qualified expert. He is not asked about common sense. I want my objection in the record, and I want it understood that I have made that objection.

The COURT: Q. Have you studied dynamics, at all?

A. Yes, dynamics is a fundamental study that precedes naval architecture. They are just an elementary study that precedes naval architecture.

Q. You have studied dynamics?

A. Yes. [627]

Mr. LILLICK: Do you wish the question repeated?

A. If you please.

(Testimony of David W. Dickie.)

Mr. LILLICK: May I have the question read?

The COURT: Read the question.

(Question repeated by the reporter.)

A. My opinion is they would not end in this position, that is to say, Exhibit 9-A shows relative positions at the time of impact, and Exhibit 9-B shows relative positions after the impact. I think that they would have had to have used their propellers and rudders in order to get in this position.

Mr. LILLICK: Q. Why?

A. Because the amount of weight that is involved in the two ships is so great that the larger vessel, which is intended to represent the "Chicago", would not have held its position and allowed the "Silver Palm" to swing, as is shown, due to the fact that there is a certain circle, certain definite circle that the ships have to go through in order to get into this position.

Q. What would have happened with respect to penetration?

A. If the two vessels struck as shown in Exhibit 9-A, there is no question about it, that the "Silver Palm" would have penetrated the "Chicago". The usual amount of penetration for two vessels in this situation is 18 feet when the moving vessel is going about $1\frac{1}{2}$ knots an hour and the other vessel is practically stationary.

Q. In addition to penetrating the "Chicago," what would be the result, if you can tell, with respect to the ultimate position of the vessels after the col-

(Testimony of David W. Dickie.)

lision, assuming that the engines of one vessel were going astern and the engines of the other vessel were going ahead?

A. If the engines of the vessel intended to represent the "Silver Palm" were going astern, or, rather, going ahead, and the engines of the vessel representing the "Chicago" were going [628] astern, the shape of the hole in the vessel that was injured, or the damage in the hole would tend to draw the bow of the "Silver Palm" to starboard.

Q. Mr. Dickie, what would you say as to the validity of the result obtained by the gentlemen who performed the tests with the two models before us as to the actual position of the "Silver Palm" and "Chicago" at sea after the collision, in view of their difference in breadth, their lack of propellers, their lack of anything tending to action upon the part of the officers of the respective vessels at sea?

A. I do not believe the models would assume anything like the normal position that vessels would at sea.

Q. Mr. Dickie, I hand you Respondent's Exhibit No. 18, and ask you whether the actual bending of the bow of the "Silver Palm" in the position shown by you on that exhibit could have been the result of the "Silver Palm" having penetrated the port bow of the "Chicago" to a depth where she finally brought up on the turret, the forward turret of the "Chicago"?

A. No. The bow of the "Silver Palm" would be crushed back in a straight fore-and-aft line, if she

(Testimony of David W. Dickie.)

penetrated the "Chicago" lying at rest rather than by crushing over to port the way she does in the drawing.

Q. With particular reference to the weight of the material in the "Chicago" in and about her forward turret and a gun in the turret forward which finally came in contact with the stem of the "Silver Palm," is there any indication upon your chart, your diagram, the exhibit before you, of the result of that contact with the forward turret and the forward gun?

A. No.

Miss PHILLIPS: Just a moment, I object to that upon the ground that this witness has not been shown to know anything about the shape of the "Chicago's" forward turret.

Mr. LILLICK: I withdraw the question. [629]

Q. Mr. Dickie, from your examination of the stem of the "Silver Palm" are you able to state whether the diagram, the Exhibit now before you, is indicative of the general result of the "Silver Palm" coming in contact with the "Chicago's" hull?

A. It is.

Q. Why?

A. That drawing was made at about a section, a horizontal section in the neighborhood of No. 2 deck; immediately above this point at a distance, above this point, there was a mark in the crushed structure of the "Silver Palm" that fitted against the gun of the "Chicago," and below this point there is

(Testimony of David W. Dickie.)

a crushed part of the "Silver Palm" that indicates that it came against some hard object, but the particular place where the hit was made, which happened to be the easiest way for me to make the drawing from, where I was, was made in the space between the turret above and this hard square compartment below, which I subsequently learned was the magazine, or something of that nature.

Miss PHILLIPS: Just a moment, that is objected to; the witness is not shown to have known that. He has never been shown to have been on board the "Chicago" at all.

Mr. LILLICK: That portion of the witness' answer beginning "I subsequently learned" may be stricken out.

The COURT: It will be stricken out.

Mr. LILLICK: Q. Mr. Dickie, in your opinion would it have been possible for the "Chicago" to have sheared off the "Silver Palm's" bow even if the "Chicago" had been coming at a speed of 18 knots an hour, if the "Silver Palm" had struck her approximately 100 feet off of her stem, and at any speed between 6 knots an hour and 11?

A. The contact of the "Chicago" with the "Silver Palm" would not have sheared off her bow, it would have crushed the material over to port.

Q. Why wouldn't it have sheared it off?

A. Because this material of which the ship was essentially of a ductile nature, in order [630] work it to the shape of the ship, at all, it must be

(Testimony of David W. Dickie.)

of such a nature that it can be bent and punched and planed and generally worked by the steel worker, and such a material is of sufficient ductility to permit of its being bent and crushed rather than sheared off.

Q. What was the size of the models used in the testing pool in Washington and in the other testing pools?

Miss PHILLIPS: Just a moment, your Honor: That is objected to. The witness has admitted that he has not had experience in these pools since 1903, and this is calling for hearsay testimony.

Mr. LILLICK: I will ask for the witness' knowledge when he was at these pools, as to the size of the models.

A. When I was at the Denney pool at Dunbarton they were using models $3\frac{1}{2}$ feet long. At the testing tank in England they were using models about twelve feet long, and in the testing tank at Hofschule, in Germany, they were using models in the neighborhood of 15 feet. Their distances were meters, I don't remember the exact meters.

Q. At the last session of court, Mr. Dickie, you were asked what your opinion was as to the speed of the "Silver Palm" at the time of the collision, and in reply to that question you said that she was going about between 5 and 6 knots per hour. On what figures did you base that estimate?

A. At the time I made that answer I did not have before me a calculation which I had developed

(Testimony of David W. Dickie.)

following a series of tests made under my supervision of the "Silver Palm." During the adjournment of court I have checked those figures and found that my figure was subject to correction, in that my figures showed the "Silver Palm" at the time of the collision was making somewhere between $7\frac{3}{4}$ and $8\frac{3}{4}$ knots per hour.

Miss PHILLIPS: I move to strike out the whole of the witness' last answer. He has not shown to be qualified to so testify. He [631] was not on board the ship at the time of the collision. Counsel is now offering his testimony to contradict the testimony of the captain of the "Silver Palm," the third officer of the "Silver Palm," and her engineers. He certainly is not shown qualified to so testify, and I move to strike out his testimony.

Mr. LILLICK: I would like to be heard. The witness is not being put on for the purpose of contradicting the testimony of our officers or crew. The witness has been asked the question because he was asked that question by the Court and not by me, and the witness, after the adjournment of Court, in going over the computation he theretofore made, came to the conclusion that he had made a mistake, and I have a perfect right to explain that mistake. I am not putting the testimony in for the purpose of contradicting any estimates of speed made by other witnesses on my part.

Miss PHILLIPS: Then I withdraw the objection. I thought that was your purpose. I withdraw my objection.

(Testimony of David W. Dickie.)

Mr. LILLICK: Q. Does the computation that you have made giving the speed of $7\frac{3}{4}$ to $8\frac{3}{4}$ knots per hour take into consideration the draft of the "Silver Palm" on the day of the collision, and is the speed mentioned by you, in your conclusion as to the speed which the "Silver Palm" was actually making, that which she was making when she actually collided with the "Chicago"?

A. Yes.

Miss PHILLIPS: I renew my objection. I thought counsel was trying to help the witness out of a very bad hole.

Mr. LILLICK: I beg your pardon, it is not fair to say I was trying to help the witness out of a bad hole.

Miss PHILLIPS: I have not made my point clear. I have just made an objection to the witness testifying as to what he thought the speed of the "Silver Palm" was on the ground that he was not qualified to answer, and counsel explained, and I withdrew my objection. Now he is proceeding along that line, and I want to re- [632] new my objection, which is that he is not qualified to testify on the "Silver Palm's" speed.

Mr. LILLICK: I withdraw the question.

Q. After the "Silver Palm" was repaired, Mr. Dickie, did you participate in tests made with respect to her speed?

A. I did.

Q. Where was that test made?

(Testimony of David W. Dickie.)

A. It was made out between the Lightship and the Farallone Islands.

Q. On what date was the test made?

A. December 20, 1933.

Q. What time in the day?

A. Between 11:30 in the morning and 12:45 in the afternoon.

Q. What was the draft of the "Silver Palm" at the time?

A. 15 feet 4 inches forward, 25 feet 2 inches aft, and 20 feet 3 inches mean draft.

Q. What was the purpose of the test?

A. The purpose of the test was to determine the time for the engines to start going astern, the time for the ship to stop and the distance that the ship run up to the time that she stopped in the water.

Q. At what speed did you commence making the tests?

A. At 13½ knots.

Q. How did you conduct them?

A. We conducted three tests. The first one was made by starting the ship off at 13½ knots, and turning 108 revolutions; the second officer took bearings on the Lightship and we ran the ship till she came to rest, and when I said "Mark," which indicated that the ship was stopped, he took another bearing on the Lightship, giving us the three sides of the triangle. The first side was obtained by the bearing on the lightship, the hypotenuse of the triangle was obtained by the second bearing on the

(Testimony of David W. Dickie.)

Lightship, and the third side of the triangle was obtained by the logged distance, and we likewise had a 90-degree angle in the first case with respect to the Lightship, and our course, and we took the angle between the line from the ship to the Lightship and the center line of the ship at the end of the course. The [633] second test was performed by means of boxes. I think I had some 200 cardboard boxes about $3\frac{1}{2}$ feet long, possibly 18 inches wide and 16 inches high, and I formed them up into a square so that they made a presentable object. I stationed second officer Sheldrake, of the ship, on the after navigating bridge, Captain Cox and the third officer were stationed on the bridge, and the Malay quartermaster was at the wheel, and at the moment when I said "Mark" Captain Cox blew a whistle and immediately the bow down on the deck below threw a box overboard. When this box passed the second officer on the navigating bridge aft, which was 312 feet away, he blew a whistle, and instantly the captain blew another whistle and another box went overboard, and this process continued, box by box, until the last box went overboard, whereupon I rushed down the ladder and followed the boxes along, noting the time that the box passed certain stanchions and certain places on the ship, and I afterwards went and measured this distance back to the bridge, so that we had the simultaneous time taken by myself on the bridge and of the second officer, Sheldrake, aft, and the distance between,

(Testimony of David W. Dickie.)

the final distance from where the box came to rest and our position on the bridge and the compass course.

Q. What was done about the engines?

A. At the time of the first signal the third officer, Stanley, threw the telegraph of the engines into reverse, and we listened to the exhaust of the engines, and it indicated by a slight noise about the equivalent to a polite sneeze at a lesson service that it had started to reverse, and we took the time at that moment. In the meantime, when the engine got going I came back and counted the revolutions of the engines through a very faint noise that you could just hear on the bridge. This was very hard to distinguish when the wind was going against us. On the third test it was conducted with relation to the boxes and the taking of times exactly as No. 2, but with [634] this exception, that at an interval of time between 45 and 50 seconds, due to a prearranged signal, the captain order the Malay to hard astarboard the rudder, and the ship started to swing on her course to starboard. With respect to the boxes on the first test, the boxes were at an absolutely straight line, as if we had drawn a chalk line along the surface of the ocean and placed the boxes on that line, and on the second test the boxes were in an absolutely straight line up to the time that the rudder was put hard astarboard. Now, after the rudder was put hard astarboard, I took reading of the compass at intervals of 15, some-

(Testimony of David W. Dickie.)

times 17 seconds, just as I could get to them, and still take the other data, and when I had finished I plotted a curve through these readings and then wrote off the 10-second intervals.

Q. What did you find with respect to how long after the signal Full speed astern was given to your engine-room that it was till the engines came to a stop?

A. The average time to stop the engines was two minutes and fifty seconds.

Q. What did you find with respect to the distance covered when the signal Full speed reverse was given until the vessel came to a stop in the water?

A. The average distance run—this is the average of all of the tests—was 3158 feet.

Q. What was the wind?

A. The wind was behind us, or astern of us in one test; we were running into the wind the other test. The wind was blowing at that time about 11 miles an hour.

Q. What did you find with respect to the time that elapsed until the time the "Silver Palm" came to a full stop in the water?

A. The average time was four minutes fifty-eight seconds.

Q. At what speed through the water did these tests show that the "Silver Palm" engines had stopped so that they could be reversed?

A. 6.02 knots.

(Testimony of David W. Dickie.)

Q. Where were you on the "Silver Palm" when these tests were made? [635]

A. I was on the bridge.

Q. Who gave the orders under which the vessel was operating?

A. In No. 1 test the Captain gave the orders; in No. 2 and No. 3 *the* tests, through an arrangement by Mr. Geary, I was to give the orders.

Q. How were the signals sent to the engine-room?

A. The signals were sent to the engine-room by means of the engine telegraph.

Q. Who *was the* helm when the experiments were made?

A. A Malay quartermaster.

Q. How were the orders given to the helmsman?

A. The orders were given in English.

Q. Did you have any difficulty with respect to the helmsman obeying orders?

A. No. At the end of Test No. 1 the "Silver Palm," after the test was finished and the vessel came to rest, the "Silver Palm" started to swing, and I asked the Malay quartermaster to give me the course, as I took down the time. Subsequent to one of the tests I asked him what the course was and he replied in English South 57 degrees west. I checked that and found it correct. Later I again asked the Malay quartermaster what the course was, and he said in English South, 62 west, which I found was also correct.

(Testimony of David W. Dickie.)

Q. Did he or did he not execute orders promptly?

A. He executed them absolutely promptly.

Q. With respect to the opportunity you had to observe the officers of the "Silver Palm" on this test, what is your opinion as to their efficiency?

Miss PHILLIPS: Just a moment, that is objected to. That is asking the opinion of the witness on efficiency. Counsel made the objection when I was examining "Chicago" witnesses on the question of efficiency, and asked each time what the witness knew of the efficiency. [636]

Mr. LILLICK: I will accept counsel's suggestion. What do you know about their efficiency?

Miss PHILLIPS: Just a moment, that is objected to, the witness is not qualified to testify to that.

Mr. LILLICK: I withdraw the question. Q. In making these tests, Mr. Dickie, did you make any allowance in your computation for the difference in draft?

A. I did make an allowance.

These times and distances I have given are the actual times that have been listed from the tests, themselves, and I have the other times if you are interested, for the making of the correction for the draft.

Q. What relation did that bear to your estimate of $7\frac{3}{4}$ or $8\frac{3}{4}$ knots speed on the part of the "Silver Palm" with respect to the correction you made?

(Testimony of David W. Dickie.)

A. With respect to the $7\frac{3}{4}$ to $8\frac{3}{4}$ speed I made all the corrections for draft and for everything else connected with it.

Mr. LILLICK: That is all. You may cross-examine.

Cross-examination.

Miss PHILLIPS: Q. Mr. Dickie, did you form any conclusion as to the angle between the axis of the "Silver Palm" and the axis of the "Chicago" at the moment of impact?

A. I did.

Q. What did you make?

A. 34 degrees.

Q. You think the "Chicago" was moving ahead at the time of impact, do you?

A. Yes.

Q. Will you describe what you think would happen when the bow of the "Silver Palm" pierced the hull of the "Chicago"?

A. I have described that in my direct examination.

Q. I want you to describe it again. In substance, was it pierced clean like a razor?

A. In the first instance, according to the speed that I calculated for both vessels, the "Chicago" was proceeding ahead in the water, and at the moment of impact the first action would be a shearing action, which would shear away part of [637] the structure of the "Chicago" as the "Silver Palm" was proceeding into the damaged part.

(Testimony of David W. Dickie.)

Q. By shearing off, what do you mean, like skidding and scraping?

A. Shaving it off like a person shaves in the morning.

Q. She would shave off the plating?

A. The structure of the ship, that structure on the "Chicago" is made of very light material, in order that the ship may make the speed that she makes.

Q. Let me get this: You are assuming that the "Chicago" was going ahead around six knots—that the "Silver Palm" was going somewhere between $7\frac{1}{2}$ and 8 knots?

A. $7\frac{3}{4}$ to $8\frac{3}{4}$ knots.

Q. Somewhere around there?

A. Yes.

Q. You were telling what is going to happen when she first struck, that is, she is going to shear off some of the structure of the "Chicago"?

A. Yes.

Q. All right, go ahead.

A. Then as the structure shears off and starts to crumple up it will pile the structure of the "Silver Palm" over to the left and bulge it out on the port, and as it comes further along and the surface becomes larger on the front of the "Silver Palm," it will tend to crumple the "Silver Palm" and crumple the material into the aft side of the cut.

Q. What I meant particularly in asking you what would happen when the bow of the "Silver

(Testimony of David W. Dickie.)

Palm" pierced the bow of the "Chicago" was, what is going to happen to the "Chicago"? Let me see if I can get that clear.

A. If you will permit me I think it can be shown here.

Q. Just a minute, I have in mind what I want to ask you. This is the forward part of the cut on the "Chicago," and this is the after part. Now, in striking that, which side is cut first of the "Chicago"?

A. The forward part is cut first.

Q. The forward part is cut first, of course. Now, my question is, do you think that there is going to be a sharp piercing of the side, [638] is it going to be absolutely clear-cut?

A. No, it is going to tear across like that, like moving my hand to the left across the photograph, it is going to tear the structure of the "Chicago" and pile it up here.

Q. There is going to be a preliminary scraping and skidding before it penetrates?

A. Yes.

Q. Is that right?

A. Yes, it shows on the model here. This part will be torn away, that is, the forward part.

Q. And then as it penetrates, the material on the "Chicago" that is cut has got to pile up somewhere, it will pile up on the after side?

A. It will pile up on the after side.

(Testimony of David W. Dickie.)

Q. What you would call a corrugated pleating would pile up on the after side?

A. Yes.

Q. Suppose the "Chicago" was stopped or almost stopped, wouldn't it be true that the forward part of the cut would be comparatively sharp and that the material of the "Chicago" would pile up on the after side?

A. No.

Q. Why not?

A. If the "Chicago" were at rest and the "Silver Palm" were proceeding ahead—I will draw it. I have drawn the line P-Q to represent the side of the "Chicago" and answering your question on the assumption that the "Chicago" was at rest, and that the "Silver Palm" was proceeding ahead, the material of the "Chicago" would be driven in toward the center line of the "Chicago" in the form of the two lines which I have *no* marked R-S.

The COURT: That does not seem hardly the angle of impact between the two ships.

A. This would be parallel with the sides of the "Silver Palm." The angle of impact between the two ships, as I have figured it out, was 34 degrees, so I will re-draw that line and put this line in red to more nearly approximate that, and then mark that "P-Q" in red; the crushed-up part of the "Chicago" will still form in like a "V" parallel to the line of the [639] sides of the "Silver Palm."

Miss PHILLIPS: Q. Then your idea is that the "Chicago" is at rest and with the "Silver Palm"

(Testimony of David W. Dickie.)

here going ahead, that the material of the "Chicago" would bend right straight back at an even "V"?

A. There would be any accordion pleating piling up on the after side.

Q. Where would all of this broken material get to?

A. It would be crushed in in the form of a "V" and would separate out as the bow went in.

The COURT: Wouldn't there be a pressing in as well as aft when it strikes on the angle of the degree that you have spoken of?

A. Yes.

Q. In other words, it seems to me that it would be pressing in as well as back.

A. Yes.

Q. Therefore, there would not be any chance to get that accordion pleating?

A. There would be some accordion pleating on the after side of the cut, but nothing to compare with this. I have seen quite a number of these collisions and the material piles to one side instead of crumpling up into a mass.

Miss PHILLIPS: Q. Mr. Dickie, materials bend or break under tension, don't they?

A. Yes.

Q. And when there is compression they pile up?

A. That is correct, but in this case here your piling up would draw the material in tension, because the distance from the point that I am marking

(Testimony of David W. Dickie.)

“O” and the other point I am marking “M”, the distance from O across that gash to the point M is shorter than the distance around. The break would bend M so that the material would stretch rather than crumple up.

Q. Well, now, Mr. Dickie, after the prow of the “Silver Palm” penetrated the “Chicago’s” side, doesn’t the damage to the bow of the “Silver Palm” depend a good deal on the character of the [640] structure encountered inside of the hull of the “Chicago”?

A. Yes. According to that photograph that is all gouged.

Q. Supposing there was a cargo of cheese in there, you surely would have something different happen to the bow of the “Silver Palm” than if it encountered a cargo of scrap iron, wouldn’t you?

A. Yes.

Q. There is bound to be?

A. Yes.

Q. And that would be true whether the “Chicago” was moving or at rest?

A. No.

Q. Either one?

A. No, it would not be; if the “Chicago” was at rest and the “Silver Palm” ran into it I would expect the bow of the “Silver Palm” to be slightly deformed and to have a hole punched through the floor where your deck was.

(Testimony of David W. Dickie.)

Q. Regardless of what kind of material she encountered inside of the "Chicago," whether the "Chicago" was full of cheese or scrap iron?

A. No, but I am assuming the structure of the "Chicago" to be the normal structure of a ship, as you usually find.

Q. But I am asking you this question and I want you to answer the question I put to you? My question is whether the damage to the bow of the "Silver Palm" does not depend to a great extent on the character of the structure encountered inside of the "Chicago"?

A. It depends to some extent, yes.

Q. That is true whether the "Chicago" is moving or at rest, isn't it?

A. The damage to the "Silver Palm" will be entirely different if the "Chicago" is moving than if the "Chicago" is at rest.

Q. You do not answer the question I put to you. Now, just try to answer the question I put to you: Isn't it true that the character of the damage to the prow of the "Silver Palm" is going to depend to a very considerable extent on the character of the structures encountered inside the hull of the "Chicago"? Answer that "Yes" or "No."

A. The answer is "Yes." [641]

Q. If the "Chicago" is moving won't the damage to the prow of the "Silver Palm" be affected by the character of the structure encountered inside of the hull?

A. Yes.

(Testimony of David W. Dickie.)

Q. If the "Chicago" is at rest doesn't the character of the structure encountered affect very considerably the bow of the "Silver Palm"?

A. Yes.

Mr. LILLICK: Do you understand you have a right to explain your answers if you wish after you say "Yes" or "No"?

A. Oh, yes, I understand that. The way she asked the question the second time was entirely different from the way she put it the first time.

Miss PHILLIPS: No, I put exactly the same question, only I had them combined in a single question and I separated them because you did not seem to follow me.

A. I followed you, but I could not answer your first question the way you wanted it answered.

Q. I think the record will bear me out that I combined the two questions and then separated the question which I put afterwards in the form of two questions, that is, if the damage to the bow of the "Silver Palm" is going to depend to a large extent upon the character of the structures encountered inside of the hull of the "Chicago", and that is true whether the "Chicago" is moving or at rest. I broke that up into two questions.

A. When you break it up into two questions my answer is all right, but when you put the two of them together my answer would have to be modified.

(Testimony of David W. Dickie.)

Q. All right, go ahead and explain.

A. The structure of the "Chicago" is going to have an effect on the "Silver Palm," but the effect on the bow of the "Silver Palm" will be different if the "Chicago" is moving than it will be if the "Chicago" is at rest.

Q. But you still say that whether the "Chicago" was moving or at [642] rest, either one, the character of structures encountered is going to have considerable effect on the damage to the "Silver Palm's" bow: Is that right?

A. Yes, it would have a considerable effect, but a different effect.

Q. Now, doesn't the final position of the bow of the "Silver Palm" depend a good deal on what the bow hits last?

A. No.

Q. Why not?

A. It depends on the bow hit all the time as it passed through the entire collision.

Q. Well, let us see if we can follow that here: If the bow of the "Silver Palm" pressing the "Chicago" meets structures that are not very resistant and then meets a structure that is very resistant, do you mean to say that that last very resistant structure won't affect the bow more than it was previously affected by the non-resistant structure?

A. It will add to the damage that has already been done.

(Testimony of David W. Dickie.)

Q. Yes, but I mean won't it affect the way the bow is turned?

A. If the previous damage has turned the bow in any one direction the auxiliary damage will add to that destruction.

Q. I think we can illustrate that on this diagram.

Mr. LILLICK: Miss Phillips, might I, before you draw the diagram, suggest that it would be better to put it on paper rather than on the board, because then we will have a record of it?

Miss PHILLIPS: I think it can be copied easily.

Q. Now, Mr. Dickie, if a breakable structure comes at a hard structure, say at an angle of 35 degrees, or 45 degrees, or whatever degrees you want, do you say that invariable this structure is going to bend inward, if this structure is moving?

A. If the horizontal line is moving it will tend to push the diagonal line over in the direction in which the horizontal line is moving.

Q. Mr. Dickie, assuming you have a straight line A-B, and we have a structure C-D striking at an angle, you say that the straight [643] line A-B, if it is moving, the structure C-D is going to bend inward in the direction of the line A-B: Is that correct?

A. Yes, that is correct.

Q. Do you say that is going to be invariable?

A. Yes.

(Testimony of David W. Dickie.)

Q. And in this structure the bend is going to come like this and the bulge is going to come on the side next to the structure A-B: You say that is invariably correct?

A. Yes, that is correct.

Q. Whereas if the structure A'-B' is stationary and the structure D-C hits it, you say that the structure D-C is going to bend?

A. If the structure D-C is a ship it will penetrate into the structure A'-B', and will push the material in in the form of a V.

Q. You have not answered my question. I am asking you as to the bending of this structure C-D, how that is going to bend. Is that going to bend inward or in the direction toward the structure it hits or is it going to bulge outward away from the structure?

A. If the structure A'-B' is at rest and the structure D-C strikes A'-B', the structure D-C will penetrate the structure A'.B'. The results more or less are a little bit confusing, because the structure of the "Silver Palm" at the bow is built up solid with heavy brackets and decks spaced about at the most six feet apart. It is very strong.

Q. I am asking you a general question on stresses and strains, and I am asking you whether or not it could ever be said to be an invariable rule as to breaking inward in the first diagram A-B. Let us go over it again. Here is a structure A-B and it is in motion; we will assume the structure D-C hits

(Testimony of David W. Dickie.)

it; you would *stay* that the structure D-C is going to bend in the direction that A-B is moving ahead?

A. Yes, that is correct.

Q. And that the bulge is going to occur on the side toward the structure A-B?

A. Yes.

Q. You say that is invariable?

A. Yes, that is invariable. [644]

Q. You say that applies in the case of ships?

A. Yes.

Q. That the bend in the structure D-C is always going to be inward on the side toward the structure A-B?

The COURT: Q. Assuming that the motion is in the direction of A-B?

A. Yes.

Miss PHILLIPS: Q. And the structure D-C hits it?

A. Yes.

Q. In that second question you say the structure A-B, when stationary and D-C hits it, D-C is going to come right in without bending the structure D-C or without bulging. Is that your testimony?

A. That is my testimony, if I understand the question correctly.

Q. I have repeated it several times and I am quite sure you must understand it.

Miss PHILLIPS: I am going to ask my associate, Mr. McWilliams, if he will, to save a little time, to make a drawing of it and then we can agree on the correctness of it.

(Testimony of David W. Dickie.)

Mr. LILLICK: I would have preferred if you had put the diagram on paper.

Miss PHILLIPS: No, I would rather have it on the blackboard, because I understand it better, and then we can have a copy made. I will ask Mr. McWilliams to draw it and I think we can agree that it is a fair representation.

Q. Did I understand you to say that the starboard anchor of the "Silver Palm" was pressed into her side?

A. Yes.

Q. And the port anchor—I am not quite sure of that, did you?

A. No, the port anchor was driven aft.

Q. Mr. Dickie, if the "Silver Palm" struck the "Chicago" right at the point of her forward gun turret, won't you concede that the starboard anchor would, by that very hitting at that point, be driven in regardless of whether the "Chicago" was moving, or not?

A. No, I won't concede that.

Q. Now, tell me what caused that anchor to be pushed in. [645]

A. By using the models of the "Silver Palm" and the "Chicago"—I don't know what the exhibit numbers are—

Q. This "Silver Palm" model is not in evidence. The "Chicago" is Exhibit 1.

A. Using Exhibit 1, if the "Silver Palm" came straight in there—the draft is not right on this—

(Testimony of David W. Dickie.)

Mr. LILLICK: May it please the Court, we are now in the situation where that model is being put in a position where I was fearful it might be put, where witnesses might be confused by its use. It is not a model of the "Silver Palm" and we have used it only in a general way. Now the witness is being asked with respect to it and particularly as to where the anchors are on the bow. I don't know how to meet this.

Miss PHILLIPS: Q. Let me ask you, do you know where the "Silver Palm's" anchors were on her bow?

A. Yes.

Q. Could you locate them?

A. Yes, on the photograph I could locate them.

Q. Let us have the photograph. Here is another story of it. Can you locate them on the photograph? Suppose you mark them in red pencil.

A. I am marking Respondent's Exhibit No. 14 with a red pencil. C is the starboard anchor and D is the port anchor.

Q. If the "Silver Palm" hits the "Chicago" such that her bow strikes against this gun turret, isn't it inevitable that anything sticking out on the starboard side of the "Silver Palm" is going to be pressed in?

A. No, because you have got the anchor above the deck of the "Silver Palm" there.

Q. I do not care if the "Chicago" was moving or not, if the "Silver Palm" strikes on that angle and

(Testimony of David W. Dickie.)

her bow gets right against that turret isn't it inevitable that that anchor is going to be pressed into the side of the "Silver Palm"?

A. There is a possibility.

Q. What is going to keep it out, what is going to keep it from [646] being pressed in?

A. The way you have got it there it would not come in contact with the turret.

Q. I am asking you if the bow of the "Silver Palm" presses right in until it hits the forward corner of that gun turret, and gets between the gun and the turret, isn't that inevitable, that that starboard anchor is going to be pressed into her side?

A. Not necessarily.

Q. Tell me why not?

A. Because the anchor is back from the stem probably six or eight feet, and you would have to crush the bow in six or eight feet, and the anchor would be pressed aft instead of being pressed in.

Q. Striking there now, this bow is going right into this deck, and what would keep this starboard anchor, whether it was six feet from the stem or not, from being pressed in, if the bow of the "Silver Palm" punctures that hole?

A. If the bow comes up against the turret it will crush the bow in and will crush the anchor aft—the anchor on this picture of the "Silver Palm" is crushed from starboard over to port.

Q. We are talking about the starboard anchor. What is going to keep it from being pressed right

(Testimony of David W. Dickie.)

into the side if the bow if hitting against the turret?

A. Because there is nothing touching the anchor. You have the anchor on the "Silver Palm" above the line of everything there.

Q. Oh, no, I have not put it there. If anybody put it there you are the one that put it there.

The COURT: The difficulty there is in the height. Are these supposed to be the same height?

Miss PHILLIPS: They are drawn to scale.

The COURT: They seem to be raised on some device which raises the bow up to a point where the top of the bow is higher than the first gun turret. Is that the way they actually stood *at* [647]

Miss PHILLIPS: These two ships are drawn exactly to the same scale.

The COURT: Are they out of the water the same amount, so that the bow should be that much higher than the "Chicago"?

Miss PHILLIPS: As to that the testimony of the "Chicago" witnesses was that the bow of the "Silver Palm" struck against the heavy gun turret.

The COURT: But the bow is much higher above the deck of the "Chicago." Is that the way it was supposed to be?

Miss PHILLIPS: I don't know specifically.

The COURT: The whole thing is, the witness is contending that that is above the deck. Is that correct?

A. Yes, the anchor on that ship, if those models are anywhere near to scale the anchor must come above the deck of the "Chicago".

(Testimony of David W. Dickie.)

Miss PHILLIPS: Q. How far back is it from the bow of the "Silver Palm"?

A. About eight feet.

Q. Then my question is, what is going to keep that anchor from being pressed right in if the starboard anchor of the "Silver Palm" is 6 feet from her stem, and 8 feet from the top part of her deck, if the "Silver Palm" penetrates the side of the "Chicago" to a distance of approximately 18 feet, striking against this, what is going to prevent that starboard anchor from being pressed in?

A. The anchor, in that case, would have passed along the top of the deck of the "Chicago" and the turret, as it came in contact with the stem, would have crushed the stem.

Miss PHILLIPS: We will have to have a little more testimony on that.

The COURT: When you are speaking of the turret, are you speaking of the base of the turret rather than the part which revolves the gun, or the base upon which the turret would rest, the heavy metal? [648]

Mr. LILLICK: I had the same idea.

The COURT: I had no idea that you were claiming that the turret with the gun in here was struck

Miss PHILLIPS: The Court I thought it was a solid base there, which must be had to maintain a turret of that weight.

(Testimony of David W. Dickie.)

Miss PHILLIPS: Admiral Laning and Admiral Simons testified that the very foremost point of the bow struck this big gun turret, and I will have further testimony on that in rebuttal to establish the way the bow caught up between the gun and the turret.

Q. You say that the starboard anchor of the "Silver Palm" is how many feet from the stem bar?

A. Approximately eight feet. I have not located it exactly.

Q. How many feet from the level of the fore-castle?

A. I could get that approximately here. The starboard anchor of the "Silver Palm" as shown on Respondent's Exhibit No. 19—

Q. Just a minute, there is a blueprint, so you can probably get it from there exactly.

A. I had the blueprints, but I gave them back to Captain Ensor.

Mr. LILLICK: We will get them during the recess.

Miss PHILLIPS: I think it better to have the exact measurements from the blueprints, so we will get them when they are here.

Q. Isn't it entirely possible that the bending of the bow of the "Silver Palm" to port would be effected if her bow was rotated to starboard at the moment of impact?

A. Yes, if she were going fast enough.

Q. That is if at the time she hit her helm was over so that she was starting to turn to starboard

(Testimony of David W. Dickie.)

wouldn't the bending of the bow to the port be explained by that fact?

A. Yes, and no. I will put it in both ways and then you can get it clear. A ship of about that size will turn through an angle of about 100 degrees in approximately six minutes, more or less, so that the movement of the bow would be very slow. If you are content to allow the bow [649] of the "Silver Palm" to be swung to starboard as slowly as that, my answer would be that the crushing of the "Silver Palm" would be caused by the turning of the bow to starboard.

Q. You did not understand my question, apparently. I asked you if the fact that the "Silver Palm" was turning, if it were found that the "Silver Palm" was turning to starboard, rotating to starboard as she punctured, whether or not the bending of the bow to port would not be caused by that very fact?

A. If you would wait long enough it would be caused that way, but it takes a long time.

Q. Mr. Dickie, I am very much interested in this sketch of yours, Exhibit 18, particularly this straight line. I do not believe you have marked it in your exhibit, but this line which is under the letter B in red, and proceeding down the diagram quite some distance, according to the scale of your sketch, this straight line is how many feet long? Have you a ruler?

A. That is about $13\frac{1}{2}$ feet.

(Testimony of David W. Dickie.)

Q. Tell me where this line extends that you have described there?

A. It is on a line with the second deck and extends from this point in a straight line back to here.

Mr. LILLICK: That did not appear in the record. What do you mean by "this line here"?

A. It extends from the point that I am marking with an "X" on Respondent's Exhibit 19, and extends in a straight line aft to the point I am marking "Y" on the same exhibit.

Miss PHILLIPS: Can you tell me what the height above the keel was of this line?

A. It is approximately 40 feet, as near as I could measure it from the photographs. When we get the blueprint I will give you the exact distance.

Q. Referring now to the red line appearing on your sketch Exhibit 18, being the straight line appearing under the initial D?

A. Yes, extending from D to Z. [650]

Q. That is the line of damage appearing on what deck?

A. No. 2 deck.

Q. No. 2 deck?

A. Yes.

Q. Does that damage extend down to 3 deck? Have you your notes here?

A. In putting this in it extends down to just No. 3 deck.

(Testimony of David W. Dickie.)

Q. Could you draw a provisional sketch showing the damage on the second and third deck? Would it be possible for you to do so?

A. I do not believe I could do it accurately enough to make it show properly. This is the second deck I have drawn here, and to draw the third deck I would have to get my notes and spend some time on it.

Q. What I am getting at is this: This is a straight line of damage, you say, from the second deck down to the level of the third deck, or did I misunderstand you on that?

A. You must have misunderstood me. This line between D and Z represents an approximate straight line, and that was on the level of the second deck, and is shown on the photograph Respondent's Exhibit No. 19 at the point X and Y which I have marked on the photograph. You can see the row of rivets, if you look at the photograph carefully, and they are indicated quite plainly, and I followed the row of rivets right across the ship and marked the plates where the second deck comes out on the port side of the ship.

Q. Perhaps the blueprint will help us on this. What is the height between the second and third decks, do you know, or do you recall?

A. I do not remember exactly. I have left that off of the drawing. I think it was nine feet, I am not sure.

(Testimony of David W. Dickie.)

Q. Was the third deck in the way of the damage?

A. The third deck in the way of the damage?

Q. Yes.

A. There was the forecastle deck, the upper deck, second deck, and third deck.

Q. I am now trying to get the character of the damage on the third deck as compared with the second deck. Does this straight line [651] indicate that?

A. No. On the third deck the character of damage is a little bit different. I can show it to you approximately from this photograph.

Q. I do not believe it would show anything, at all. What I would like to have you do would be to draw a sketch of the damage on the third deck and on the second deck, so that we could get a picture of the two.

A. I may be able to do that from the photograph. This sketch was made, as I testified to, by taking angles from across the deck and using the dock as a base line and that whole thing was laid off by means of angles.

Q. That does not represent a sketch made after going on board the ship and comparing the damage there?

A. No, this was made from the outside of the ship from the dock. I stood up here and I established the angle along this cut, and established the angles across here, and when I got the angles all laid off I started in to count the rivets; you could see

(Testimony of David W. Dickie.)

the rivets where they were broken, and then after I had counted the rivets and marked the number of rivets, and all that sort of thing, then I went to the rule and checked up the rivets to see that I had the right size and right placing of the rivets.

Q. What I am getting at is this, this Exhibit 18 is a floor plan, apparently you have superimposed one floor on top of the other.

A. That is right.

Q. Had you ever been on board the ship to ascertain whether this corresponds to the damage on the ship?

A. On the inside?

Q. Yes.

A. No, just on the outside.

Q. I am still worrying about this straight line which you say is the second deck damage. Does that represent the actual pushing of the inside of the "Silver Palm" at the second deck, this straight line?

A. Yes.

Q. And the actual pushing in at that point?

A. The actual pushing [652] in from the starboard side of the "Silver Palm" and the distance from the point R up to the point D is measured along this line, and the crooked line from R to D is the same as the distance from R to S and the distance from O on the port side of the second deck to the collision bulkhead No. 166. The distance from O measured around the crumpling of the side

(Testimony of David W. Dickie.)

of the deck line to the point D is the same as the distance from O up to the point S.

Q. So this line D-Z on the third deck represents an actual pushing of the deck at that point?

A. Yes.

Q. And the other side, this line with several bulges, represents the bulging of that deck in that way?

A. Yes.

Q. On that deck?

A. Yes.

Q. That is right?

A. That is correct.

Q. What type of construction is there on the second and third decks? Is there a forepeak tank right at the bow of the "Silver Palm"?

A. Yes, below No. 3 tank, you can see it on the photograph.

Q. That is what I want to get at. Do the second and third decks go through the forepeak tank?

A. No, the forepeak tank is below the No. 3 deck.

The COURT: I think we will take a recess now until two o'clock.

(A recess was here taken until two o'clock p. m.)

(Testimony of David W. Dickie.)

Afternoon Session

DAVID W. DICKIE,

Cross-examination (resumed)

Miss PHILLIPS: Before I forget it, I would like to have this sketch which represents the diagram on the blackboard offered in evidence.

Mr. LILLICK: No objection, your Honor.

The COURT: You agree that is a true picture of that drawn on the blackboard?

Mr LILLICK: I would say otherwise you would have to make a photograph of the drawing.

(The diagram is marked "U. S. Exhibit 18.")

Miss PHILLIPS: May I have the last question and answer read?

The COURT: Read the last question and answer.

(The record was here read by the reporter.)

A. Might I correct that answer? I find that the forepeak tank goes up to the two deck and that No. 3 deck is composed of a plating at the side approximately 40 inches wide, which goes along the ship's side and meets up at the bow in a breast hook.

Q. You might say a little plating along the side of the ship?

A. Yes.

Q. And No. 2 deck—

A. No. 2 deck comes straight through and is water tight.

Q. It is a water-tight compartment?

A. Yes.

(Testimony of David W. Dickie.)

Q. Mr. Dickie, did you get the figures about the location of the anchors?

A. Yes.

Q. Can you give us that now, please?

A. Yes. The turn of the anchor is about five feet from the stem and the after end of the anchor is about nine feet from the stem. The center of the anchor is about five feet below the forecastle deck and the bottom of the anchor [654] is about almost eight feet, not quite, from the forecastle deck.

Q. Can you give me the dimensions of the top of the forecastle deck, from the keel of the ship?

A. From the top of the forecastle deck to the keel of the ship?

Q. Yes.

A. That is, as near as I can get it, 55½ feet.

Q. What would be the distance of the center of the anchor from the keel of the ship?

A. From the center of the anchor to the keel line is about 50½ feet.

Q. Do you know what is the construction of that second deck that comes right straight through to the very stem of the ship? Have you been on board and do you know of your own knowledge?

A. Yes, I was on board the ship.

Q. Then refer to your notes.

A. But I did not go right up into this place because it was occupied, but the second deck on the ship is composed of plates, a large breast of plates

(Testimony of David W. Dickie.)

right in the bow, and then the next plating immediately aft of that goes athwartships with a water-tight hatch down through it, and the next plate runs parallel with the ship's side on each side, and the other plating that joins those two side plates run fore-and-aft.

Q. It is a steel deck, then, is it?

A. A steel deck, water-tight, double riveted.

Q. What is the weight of that plating?

A. It seems to be .44 of an inch.

Q. .44 of an inch?

A. That will give you the average of the covering.

Q. Now, Mr. Dickie, I am going to go back to that sketch of yours, Exhibit 18, and let us look at that again for a minute. The deck structure, I understand you to say that this straight line which we have marked D-Z was bodily pushed back on the second deck: Is that correct?

A. Yes.

Q. Which would account for the bulge back of it?

A. Yes. [655]

Q. That is, the metal pushed back has to go somewhere and it goes into the bulge?

A. Yes.

Q. If you think the "Chicago" was moving ahead at 6 knots or so or more and crushed this back in a straight line like that, how do you account for the fact that it was not pushed away back?

(Testimony of David W. Dickie.)

A. The ships came to rest.

Q. Do you think it was because the structure of the "Silver Palm" at this deck being so placed as you have given it, that it was strong enough to bring the "Chicago" to rest at that point: Is that your explanation of it?

A. Yes, I would say that between the crushing here and the crushing on the "Chicago" that the cushioning eventually brought the ships to rest.

Q. Whereas if the "Chicago" had been as strongly constructed as the "Silver Palm," would it be your opinion that this line D-Z would be further moved back?

A. Yes, the damage would have been greater on the "Silver Palm" if the "Chicago" had been made of the same thickness of metal as this vessel.

Q. So it is because the "Chicago" was lightly constructed there that accounts for this damage line not being moved further back?

A. Yes.

Q. If she had been in fact very strongly constructed at this portion there would not be any doubt in your mind but that this line would have moved further back and this bulge, instead of being where it is, would have moved several feet the other way?

A. It would have moved further back. I would not want to express an opinion as to how far back it would have moved, but this line most certainly would have moved further back if the "Chicago"

(Testimony of David W. Dickie.)

had been built as strong as this ship is, of the same thickness of material.

Q. So then you might also say that it was because of the strength of the "Silver Palm's" construction here and her plates to withstand the pressure of a lighter body that accounts for this [656] straight line: Is that about it?

A. You mean why that line is straight?

Q. Yes.

A. The line is straight because of the cushioning and folding of the material of the "Chicago," acting as a cushion, that it happened to be in a straight line.

Q. You don't think there could be any structure of the "Chicago" which in itself could account for this straight line?

A. No, there was no factor that entered into the picture, that I see, that would make that a straight line, in preference to any other. It just happened that the gathering of the material in the "Chicago" into a fold acted as a cushion and caused that to be in a straight line.

Q. I want to understand again, and I am not sure that I have got your testimony this morning; if I am repeating too much I beg to have you pardon me. If the "Chicago" was stopped, or almost stopped, when the "Silver Palm" struck her, would you say that the accordion pleating on the "Chicago" would have been on the forward part of the cut?

(Testimony of David W. Dickie.)

A. No, I would say that there would be no accordion pleating appearing on either side of the cut. My judgment, from what I have seen on other vessels that had been in collision, my opinion would be that the plating would be opened out into a V and would be lying comparatively straight along each side of the cut with an opening in the depth far under.

Q. With each side clean-cut?

A. With each side of the plate bulged out.

Q. By the way, you have spoken of your experience in collision cases. Have they been for the most part in merchant vessel collisions?

A. This is the only case that I have been on that involved a warship; the only ones that I investigated in other cases were stranding cases, I have investigated the "Tacoma" and the destroyers down South, and the submarine up north. There was a personal friend who raised that submarine.

[657]

Q. Mr. Dickie, in merchant vessels, when the prow of one ship strikes into the side of the other, would you say that the structure which was encountered inside was for the most part homogeneous or heterogeneous?

A. No, the structure inside of a merchant ship is usually at intervals of anywhere from eight feet to twelve feet, depending on the type of the ship. In between the eight-foot space of the deck three would usually be a stringer. In between the 12-foot space of the deck there would usually be two string-

(Testimony of David W. Dickie.)

ers, depending on the type of stringers of the ship. Wherever a collision occurs between two merchant ships it will usually be found that where the decks occur, if the ship that is struck is standing still you will find the ship that strikes will have the shell plating punctured on the line of the decks and the shell plating will usually be corrugated in between that.

Q. That is very clear. It would be true, then, that the merchant vessel arranges her hold with a plate going athwartships at regular intervals without very much division up of the space on the decks, themselves? Do you follow what I have in mind? I don't know whether I am clear or not.

The COURT: The bulkheads.

Miss PHILLIPS: The bulkheads.

A. The bulkheads which divide the ship in a fore-and-aft direction are usually spaced about 48 to 56 feet, depending on the structure of the ship and her structure numbers or numerals, as we call them. In a tanker they are usually in the neighborhood of 28 feet on the old tankers. I am not so sure about the new tankers.

Miss PHILLIPS: Q. So that in a merchant ship, if I get your description, which seems to be very clear, we have a division between decks of 8 to 12 feet, depending upon, I suppose, the use the particular vessel is put to, bulkheads coming athwartships at intervals of 50 feet or thereabouts?

A. Yes. [658]

(Testimony of David W. Dickie.)

Q. But not a subdivision of each hold to make smaller compartments?

A. No.

Q. Is that right?

A. The only case where the holds are subdivided into smaller compartments is where they have such cases as carrying bullion, they have a strong-room, or a refrigerating ship will be divided up into compartments because they want to carry different kinds of fruit in one compartment than in the other.

Q. Mr. Dickie, might I ask you again, did you say the damage which was suffered by the "Silver Palm" could not have been caused if the "Chicago" was stopped or almost stopped?

A. The nature of the damage on the "Silver Palm" could not have been caused in this form if the "Chicago" were stopped, for the reason that the "Silver Palm" was swinging to starboard at the time of the accident about three feet in five seconds, or about one-third of a knot an hour, whereas the "Chicago" was going ahead about 5 knots an hour, or 15 times as fast as the "Silver Palm" was advancing in an hour, and for direction between $7\frac{3}{4}$ and $8\frac{3}{4}$ knots an hour, which is in the neighborhood of 24 or 25 times as fast.

Q. That is what I was trying to get at. That is, when you say that the damage to the "Silver Palm" could not have been caused if the "Chicago" had stopped or almost stopped, what speed are you allowing the "Silver Palm" when you say that?

(Testimony of David W. Dickie.)

A. The "Silver Palm" was going ahead in a fore-and-aft direction between $7\frac{3}{4}$ and $8\frac{3}{4}$ knots an hour, but she was swinging to starboard; the bow of the "Silver Palm" was swinging to starboard about one-third of a knot an hour or less, and the "Chicago" was going ahead, according to my figures, between 5 and 6 knots.

Q. What I wanted to get at was your estimate of the speed of the "Silver Palm." When you say that this damage could not have been caused if the "Chicago" was stopped, or almost stopped, I was trying to get from you what speed you are giving the "Silver Palm" when you [659] say that, when you are estimating it $7\frac{1}{2}$ to $8\frac{1}{2}$ knots an hour?

A. $7\frac{3}{4}$ to $8\frac{3}{4}$ knots in a fore-and-aft direction, but the speed of the bow going to starboard was so slow in comparison with the other speed that it cancels out.

The COURT: What would you imagine was the rudder bearing, or the helm bearing on the "Silver Palm" at the time she struck?

A. Hard a-starboard.

Q. Hard a-starboard?

A. Yes.

Q. She was swinging and it was hard a-starboard?

A. At the time of the collision.

Q. She turned about how much, about 35 degrees?

A. No, she would have turned, that is, from the captain's testimony, she turned from 156 to 168

(Testimony of David W. Dickie.)

degrees, but the speed at which the bow was moving was only one-third of a knot.

Q. In other words, what I am trying to find out, when the "Silver Palm's" rudder was hard a-starboard, were you given any data as to how she responded?

A. It was not stated.

Q. What is your estimate, going at the speed you indicated, as the speed of the "Silver Palm," with a hard a-starboard, she would actually turn?

A. One-third of a knot an hour.

Q. I cannot understand that, what you mean by one-third of a knot an hour. I want the angle of turn, that is, from going ahead straight. In other words, what was the angle of the turn?

A. She swung from 156 degrees to 168 degrees in thirty seconds, that is 12 degrees in 30 seconds.

Q. 12 degrees in 30 seconds?

A. Yes.

Q. That was your computation?

A. That is my observation from the ship.

Q. That was your observation at the time that you took the ship out to the Farallones?

A. Yes, on the ship.

Q. I have not read any of the depositions, so I thought if you had [660] taken it from somewhere that it was from the depositions. I knew I had not seen it.

Miss PHILLIPS: Q. Then you did not pay any particular attention to the change of the rudder in your calculation because a rudder change is

(Testimony of David W. Dickie.)

inconsiderable in effect when you are comparing it with the forward speed of $7\frac{1}{2}$ knots?

A. The swing of the ship from the action of putting the rudder hard to starboard is negligible as compared with the motion either of the "Silver Palm" or the "Chicago."

Q. I think I follow you. That is, the kinetic energy engendered by the force of the impact between the two ships is so much greater than the kinetic energy to be derived from the change of rudder that you disregarded the rudder change entirely: Is that it?

A. Yes; it is, roughly, from 15 to 24 times greater due to the motion of the ship through the water than it is due to the swinging of the ship to starboard.

Q. That would be true also as to any particular rudder change on the part of the "Chicago," the same thing there?

A. Yes, the same thing would apply there.

Q. By the way, how do you know that the "Silver Palm" was swinging to starboard at the time of the collision? You don't know it from your own knowledge, do you?

A. No, I took that from the captain's testimony.

Q. That is, from the testimony of the captain of the "Silver Palm"?

A. Yes.

Q. You did not compute that from the results of the collision, though?

(Testimony of David W. Dickie.)

A. The captain's testimony gave me the 156 degrees the course he was on, and the 168 degrees the course he was on at the time of collision. I think I took the ship through the test and when I had brought her from 156 degrees to 168 degrees, as a matter of fact I did not take the information exactly on those figures. I [661] took progressive information and then calculated at the point for 168 degrees.

Q. Mr. Dickie, taking up now the matter of these tests that you made with the "Silver Palm" on the 20th of December. I think you gave the draft of the "Silver Palm" forward as 15 feet 4 inches—kindly refer to your notes.

A. 15 feet 4 inches forward, 25 feet 2 inches aft, a mean of 20 feet 3 inches.

Q. I observe that according to the "Silver Palm's" log at the time of the collision she had a forward draft—I won't say at the time of the collision, I mean at the time of leaving San Francisco at midnight before the collision, that is, eight hours previously, I observe that her draft forward is 22 feet and her draft aft 25 feet 2 inches. That is correct, is it not, according to the log?

Mr. LILLICK: Yes.

Miss PHILLIPS: That would represent a difference of how many tons of cargo or other stores aboard the "Silver Palm"?

A. If I may change your question—

Q. Surely.

A. The displacement of the ship of 22 feet forward and 25 feet 2 inches aft, a mean of 23 feet

(Testimony of David W. Dickie.)

7 inches, would be 13,215 tons, and the displacement of the ship at the time I made the test would be 11,105 tons.

Q. It would make a difference in the momentum of the ship, would it not, at 108 revolutions?

A. Yes.

Q. If I remember correctly, speed times weight equals momentum, does it not, or what is the formula on that?

A. No, I think it is mass times speed is the formula, but I have the thing calculated out if you want it.

Q. What I was going to say was, if the "Silver Palm's" engine revolutions were 108 and the displacement was approximately 11,000 tons, she would not have the same velocity or momentum that she [662] would when her displacement is 13,000 and some odd tons at engine revolutions of 108?

A. Not quite, there would be a little more slip.

Q. Mr. Dickie, when you said the engines were making 108 turns at the time you began these tests, can you tell me how long they had been making 108 turns?

A. The shortest time that we allowed between tests was approximately one-half hour; that is to say there was approximately one-half hour between tests to bring the vessel up to speed for the next test. Does that answer your question?

Q. What I am getting at is this, after completing one test I presume you slowed and turned

(Testimony of David W. Dickie.)

around and got yourself ready to make the next test, did you not?

A. No. We completed a test, after which the ship came to rest, and then we put the ship full speed ahead in order to bring her up to full speed again for the next test, and that time between putting her full speed ahead and until we began the next test was approximately one-half an hour.

Q. In making your test, what allowance, if any, did you make for current?

A. The first test had to have a small allowance for current, but I could not tell how much. The other two tests required no allowance for current, because our boxes that we dropped overboard were distributed along like fence posts on the surface of the ocean and drifted with the current at the same rate that the ship was drifting.

Q. Why was it in the first test you made an allowance for the current?

A. In the first test I did not make any allowance for current but there should be a little allowance made. The first test was taken from a positive bearing, which is the Lightship, which has a flow of current past it, and therefore whatever current was flowing past the Lightship at the time, that correction should be made in the first test. The other two tests, there need be no correction made for current. [663]

Q. What I am getting at, Mr. Dickie, is this, was the current, for instance, in your first test with or against the ship?

(Testimony of David W. Dickie.)

A. In the first test, well, as a matter of fact, I don't know, because I had no means of measuring it. The nearest information that I could get to work from was in between Point Bonita and Mile Rock, and the one on the outside was at the Farallone Islands, and the current at the Farallone Islands is what is known as a circular current, it flows backward and forward like the hands of a clock; but the current inside at Point Bonita flows with the regular current table. We were out there at the Lightship, which is between the Farallones and this other current, so I could not express an opinion on that.

Q. You don't know how much the current was, nor to what extent it would affect the velocity of the ship?

A. No.

Q. Mr. Dickie, did I understand you to say that you were able to count the revolutions of the "Silver Palm" astern?

A. No, I was able to count the revolutions of the engine when the "Silver Palm" was going ahead, and when we reversed the engines there was no noise from the engines of the "Silver Palm," because the power was shut off, that is the explanation of it, you could not hear anything on the bridge, but when the engines started in reverse it made that noise that I described before, like a polite sneeze, just enough to indicate that we knew it had started.

Q. Your first test was when the ship was going ahead at 108 revolutions and you stopped the engines?

(Testimony of David W. Dickie.)

A. No, we placed the telegraph from full speed ahead to full speed astern. Now, what happened in the engine-room is a matter for somebody else, I was not there.

Q. You don't know what happened in the engine-room?

A. No.

Q. By the way, was there an engine-room indicator on the bridge showing the engine revolutions?

A. No.

Q. How long did it take, in your observation, from the moment the [664] engine-room telegraph was thrown astern until the engines were stopped?

A. The average time of all the tests was 2 minutes and 50 seconds.

Q. You said the average time. What was the greatest time?

A. No. 1 test was 3 minutes and 2 seconds, No. 2 test was 3 minutes and 6 seconds, and No. 3 test was 2 minutes and 21 seconds.

Q. How could you tell when the engines were in fact stopped?

A. That statement really should be corrected. What I mean is those are the times when the engine gave her first sneeze, indicating that she had started in reverse, not when she stopped.

Q. Mr. Dickie, you have given there three figures there, two figures showing a time for stop exceeding 3 minutes and one figure where it was 2 minutes and 21 seconds.

A. Yes.

(Testimony of David W. Dickie.)

Q. Isn't that a rather large discrepancy for a test like that?

A. No, the reason for that is, the long one is the one in which we had the breeze astern, and the short one is when we had the breeze ahead.

Q. I see, that is, you were accounting for a breeze there?

A. Yes.

Q. Helping to take the momentum off your ship, is that right?

A. Yes.

Q. Do you know what repairs were made to the engines of the "Silver Palm" while she was here in court following the collision?

A. I do not know about that.

Q. You don't know whether any changes were made in the engine?

A. I don't know anything about that. There were none that I know of.

Q. Do you know whether any changes were made in the engine equipment, cylinders, or anything of that sort?

A. No.

Q. You don't know?

A. No.

Q. Do you know what persons were on duty in the engine-room when these tests were made?

A. I went down in the engine-room before [665] the tests were made and looked the engines over, and the chief engineer I know was on duty. Now,

(Testimony of David W. Dickie.)

who the others were in relation to their positions on the ship I don't know.

Q. Mr. Dickie, I think you said on your direct examination this morning—you were asked the question, I think, Would it have been possible to shear off the "Silver Palm's" bow even if the "Chicago" were going ahead at a speed of 18 knots; will you give me your answer to that question again?

A. My answer would be no, because the material of which ships are built has to be more or less ductile, and the material would crush up and fold up into a mass of crushed material, and the bow would not shear off, cut right off.

Q. Do you mean that the actual metal plates, themselves, would crumple up without tearing and breaking apart?

A. The near side might tear, but it would pile up just the same as it is piled up in the after end of the cut on the "Chicago."

Q. In discussing the model tests that were made this morning I believe you said something to this effect, that with the cleats on the keel of the "Silver Palm" there would be a difference because there would be a greater wetted surface and that would have affected the displacement.

A. What I said was the presence of the keel 3 feet deep on the bottom of the "Silver Palm" would have increased her wetted surface.

Q. And I think you added to that, "Would have changed her displacement"—you made some reference to her displacement.

(Testimony of David W. Dickie.)

A. The keel of the model, if it is 3 feet deep is also 3 feet thick. There are 9 cubic feet in that keel for each foot of its length, which would have increased her displacement.

Q. If the two models were weighted in the proportion of 13 to 12 doesn't the weighting of the models take care of little incidental changes in displacement, such as that?

A. The model that should [666] have been used for the "Silver Palm"—

Q. Now, just a moment. I think you can answer my question "Yes" or "No," Mr. Dickie. May the question be read to the witness?

The COURT: Read the question.

(Question repeated by the reporter.)

A. I don't understand what you mean by 13 to 12.

Miss PHILLIPS: Q. Well, assume when the tests were started that one model was weighted to weigh 12 and the other 13, that is, there was a difference in that proportion between the two models. If the proportion of weights of the two models are fundamentally correct, doesn't that take care of little incidental changes of displacement such as a false keel?

A. Yes, if the models were correctly adjusted as to their displacements, the only correction that would be necessary for the false keel would be that attributable to wetted surface.

Q. You said this morning, I think your exact language was, the change in wetted surface would

(Testimony of David W. Dickie.)

add to the displacement error. I think I am quoting your exact language on that. Is that what you mean?

A. No, that is not my exact language.

Q. All right, correct me, please.

A. The change in wetted surface would add to the frictional resistance of the ship and would have nothing to do with the displacement.

Q. Well, if you are allowing for a specified speed at the moment of impact, doesn't the allowance for speed take care of frictional resistance?

A. No.

Q. Why not?

A. Wait a minute. The speed is proportional to the square root of the linear dimensions of the model. The displacement is proportional to the cube of the linear dimensions. The resistance is proportionate to the cube of the linear dimensions. The horsepower is proportionate to 3.5 power of the linear dimensions. The wetted surface is proportional to the square of the [667] linear dimensions. Therefore, the power that you are discussing is divided into two, as a matter of fact it is divided into three separate entities. The first is the power necessary to overcome the frictional resistance of the hull, and No. 2 is the power necessary to overcome the wave-making resistance of the hull, and No. 3 is the power necessary to overcome the residual resistance or eddy-making resistance of the hull. The difference between the models and the ships, themselves, as determined by the tests, only applies to

(Testimony of David W. Dickie.)

one of these. The other two had to be calculated according to the surface of the model.

Q. Now, Mr. Dickie, what I am getting at is this, when you allow a certain speed for one vessel or one model to hit another, don't you, in making that speed allowance, take into consideration the friction which the vessel might have through the water?

A. No.

Q. Suppose, for example, a ship had a clean bottom or did not have a clean bottom, when you allowed a speed of a certain amount didn't that speed take care of whether or not the ship has a clean bottom?

A. No.

Q. Why not?

A. The frictional resistance has to be calculated for the particular surface that you are dealing with. We have a separate coefficient of friction for each particular type of surface. We have clean paint in one case, and we will have a certain coefficient of friction; if there are barnacles on the surface of the plating of the ship there will be another coefficient of friction, and all of these separate coefficients of friction have to be applied to the ship and applied to the model, as they are different.

Q. Mr. Dickie, aren't you talking about the power which you have to have on board a ship in the various coefficients combined to acquire a given speed? Isn't that what you are talking about when you are talking about all of these coefficients?

(Testimony of David W. Dickie.)

A. No. The [668] power is in proportion to 3.5—that is the horsepower, that is in the proportion of 3.5 power of the linear dimension. For example, when he used the string to tow the model the towing by the string went in the relationship of the cube of the linear dimension, and if you had put a propeller behind the model and had pulled the propeller along with the model with a regular proper towing machine he would have used 3.5 power of the linear dimension.

Q. I want to confine your answer, now, Mr. Dickie, to the question I am putting to you. When you speak of the barnacles affecting the bottom of the ship, don't you mean that if the ship had barnacles on the bottom of the ship then she must make greater engine revolutions in order to obtain a given speed than if she did not have barnacles?

A. Yes, that is correct.

Q. Then if you say that a ship at a certain speed had a given momentum then you take care of the question of whether or not she did or did not have barnacles, and whether she did or did not have to have particular engine revolutions at that time?

A. Yes, that is all taken care of, but that will relate itself properly to the models.

Q. We will go on to another point: Have you ever performed any ship model tests since you were in England and Scotland back there in 1903, 1904, or 1905, or whenever it was?

A. No.

Q. Do you approve of ship model tests?

A. Yes.

(Testimony of David W. Dickie.)

Q. Why have you not performed ship model tests?

A. I never had occasion to design a ship in which the owner could afford to have the ship model tests performed. They are quite expensive.

Q. I am going back for another moment or two to the question of the "Silver Palm's" bow, that it would be crushed but could not be sheared off: Doesn't the extent of break on any metal depend on the tension that it is put to?

A. Yes.

Q. Why did you say that the "Silver Palm's" bow could not be [669] sheared off?

A. Because there is too much internal structure on the inside to tear away; that is a mass of plates and angles in there.

Q. How are you using the term "sheared off"?

A. I am using the term "sheared off" in the technical sense, that you take a piece of plating, assume that this piece of paper were a continuous piece of plating, if this piece were cut off at right angles to its surface it would be sheared off.

Q. When you speak of bow being sheared off, you mean actually cut off?

A. Yes.

Q. Take it away from the ship?

A. Yes.

Q. Breakage, which would mean that the bow was broken through on both sides with perhaps some resisting material so that it would string along the side, you would not consider that sheared off?

(Testimony of David W. Dickie.)

A. No. As I use the word sheared off, I mean that the bow would be cut right off.

Q. And floating around the ship?

A. As if you took a knife and cut it through.

The COURT: Q. And detached it?

A. And detached it, yes.

The COURT: We will take a recess for a few minutes.

(After recess:)

Miss PHILLIPS: Q. Coming back to the question of these little cleats on the bottom of the "Chicago" model, if the "Chicago" model was given the correct relative speed in the tests made, wouldn't the eddies caused by these little lugs along the bottom be inconsiderable in comparison with the speed ratio?

A. The eddies caused by these little pieces on the model would be perceptible in the eddy-making resistance of the model, but when they were related to the large ship, which would be in the proportion of 3.5 power of the linear dimensions, it would become quite appreciable in the eddy-making resistance of the "Chicago." [670]

Q. Let me see if I understand you. You said that the "Chicago" had cleats in the same proportion as these little cleats on this model that would make a substantial difference on the "Chicago"?

A. In the power required to drive the "Chicago" at that speed.

Q. However, there again if you have allowed a correct speed to the model then you have taken care of that?

(Testimony of David W. Dickie.)

A. If you have allowed correct speed for the model then you have taken care of it.

Q. Referring now to the eddies, if you say that the energy aroused by the rudder is inconsiderable to the force of the blow, wouldn't you also say that these little eddies caused by such cleats as that were insignificant?

A. I did not say that, though. You have got two things mixed up.

Q. I don't think I have, but go ahead.

A. Or I have got them mixed up, then. The retarding force to the speed of the ship by putting the rudder hard over is quite considerable, and will reduce the speed of the ship in time as much as two knots. That is one thing. The swinging portion of the ship, the swinging portion of the bow of the ship, going at one-third of a knot, is an inconsiderable amount as compared with the speed of the "Chicago" going ahead 5 knots.

Q. But what I am asking you is, if you have the speed relatively correct, then you take care of whatever effect might be caused by the rudder?

A. If you have the speed of the "Chicago" with the rudder hard over, and the speed of the model with the rudder hard over relatively correct then you have taken care of it.

Q. If you have the speed of the model relatively correct then you take care of the little eddies caused by these little cleats?

A. Yes, you have taken care of that, but you have added more power to the model than you add

(Testimony of David W. Dickie.)

to the ship. The power will not be in the proper relationship.

Q. But there, again, that depends on whether or not you have [671] the correct speed ratio?

A. If you have the correct speed ratio the power line will not be correct.

Q. Mr. Dickie, I think we could argue the rest of the day about this, you apparently do not get what I am driving at. For instance, if you should hold this model at a given angle, it does not make any difference, at a given speed it does not make any difference how long beforehand you have been maintaining that speed if you have got a certain speed at the point of impact, does it?

A. You are assuming now that you have the correct speed at the point of impact?

Q. Yes.

A. If you have the correct speed at the point of impact then what is your variable?

Q. I am asking you the question. Just repeat my question back again.

The COURT: Read the question.

(Question read by the reporter.)

A. It does not make any difference in what?

Miss PHILLIPS: Q. (Continuing) In the results obtained by the tests, if I have a certain speed at a certain angle, it does not make any difference how I get that speed, does it, whether I put on a thousand engine revolutions or twenty engine revolutions, if I get that, does it?

(Testimony of David W. Dickie.)

A. If you have the speed correct at the moment of impact I cannot see that it would make any difference how you obtain that speed.

Q. Of course, that is common sense. Now, in the same way, if you have the speed of the ship that is struck relatively correct, it does not make any difference whether or not that speed was slowed down by cleats on the bottom of the model, does it?

A. No, if you have the speed relatively correct at the moment of impact.

Q. If you have the speed relatively correct you have taken care of all of those other things like that, what kind of fuel oil you have, or what kind of engine-room men you have?

A. If you have [672] the speed correct and neglect all the other factors, then the speed is correct.

Q. Will you tell me what is the formula for the speed ratio between the speed of a prototype and the speed of a ship model in the performance of a ship model test?

A. May I have that question read?

The COURT: Read the question.

(The question was repeated by the reporter.)

Miss PHILLIPS: I would like to have you give me that without referring to the notes. That is a very simple fundamental question.

A. What do you mean by prototype?

Q. Prototype is the scientific term, Mr. Dickie, for the original object, whatever it is, that you are testing out with a little model. For instance in this

(Testimony of David W. Dickie.)

case the speed of the prototype would be the "Chicago" or the "Silver Palm." My question is what is the speed ratio or what is the formula for the speed ratio, whatever way you want to put it, the speed ratio between the speed of the prototype and the speed of a model in performing a ship model test.

A. The speeds are proportional to the square of the linear dimensions.

Q. Tell me how you would work it out. Just tell me the formula.

A. You divide the length of the ship by the length of the model and get the term L , which is the linear dimension ratio. Then the speed of the ship and the speed of the model would be in proportion to the square of the linear dimensions.

Q. Could you put it on the blackboard, or could you put it on a piece of paper? Take any speed ratio you want and tell me how you work it out.

A. If the ship is twice as large as the model the speed of the ship will be four times that of the model.

Q. I think you said this morning that the actual speed that the "Silver Palm" was going when the engines were stopped was 6.2 knots. Have I it correctly?

A. No, 6.02. [673]

Q. 6.02?

A. Yes.

Q. That is after your test of the "Silver Palm" on which you had your engine 108 revolutions ahead

(Testimony of David W. Dickie.)

you stopped the engines, and when the engines were in fact stopped in the water you said the ship was going 6.02 knots ahead?

A. When the first sneeze came showing that the engine had started astern, then the speed of the ship was 6.02 knots through the water.

Q. How do you know she was making that speed?

A. I had boxes thrown overboard and I ran 312 feet in a certain time, and then 312 feet more in another time, and I plotted the curve, showing the time and the distance run, and at the time that I heard the first sneeze from the exhaust showing that she had started astern, then I plotted a tangent of that curve.

Q. Did you make these measurements, yourself, of the boxes?

A. Yes.

Q. The engine revolutions were at zero when the ship was, in fact, going 6.02 knots ahead?

A. When the ship was making 6.02 knots the engine revolutions were at zero.

Q. There was a lag between the actual speed and the engine revolutions. Now, I think I am correct in this, but I am not sure, but correct me if I am mistaken, I think your calculation upon this test that you made from the time the "Silver Palm" was going 108 revolutions ahead until she was dead in the water she had traveled 3158 feet. Have I the figures right?

A. Yes, the average distance run was 3158 feet.

(Testimony of David W. Dickie.)

Q. That is, with the "Silver Palm" weighing 11,000 tons?

A. 11,105 tons.

Q. Did you say you had made a calculation as to what would have happened if she had a weight of 13,000 tons instead of 11,000?

A. Yes, I have.

Q. Have you those calculations here?

A. I have the answers, I have not got the calculations. [674]

Q. Well, have you a formula? Let us see how you work it out.

A. I plotted the speed and horsepower curve for that ship at 11,105 tons displacement, and then I plotted another speed and horsepower curve for the ship at 13,215 tons displacement. I then calculated the basis as to deceleration for the horsepower at 11,105 and 13,215 tons; between the limits of the 13½ knots, the speed of the "Silver Palm" when the collision took place, I took the proportional increase of the distance run and the times between the two basic curves and used that to compare the actual time which I took from the ship to get the times that applied for the ship at the 13,215 tons displacement.

Q. What difference did you find?

A. It was approximately one-eighth more—the decimal in one case was 1.12, and the decimal in the other case was 1.128, and one-eighth is 1.12, so I used that amount.

(Testimony of David W. Dickie.)

Q. So then you figured that the "Silver Palm," instead of covering 3158 feet would at a weight of 13,000 tons have covered approximately 3500 feet?

A. 3572 feet.

Q. 3500 feet, or thereabouts?

A. Yes.

Q. What allowance did you make for the difference in momentum and the capacity of the ship to slow down from a weight of 13,000 instead of a weight of 11,000?

A. Can I have that question read?

The COURT: Read the question.

(Last question repeated by the reporter.)

A. I assume you are referring to the fact that there is a difference in speed of the ships on account of the two displacements?

Q. Yes.

A. In this particular case the difference in speed of the ships between the 11,000 and 13,000 is very small. We checked up the speed of the "Silver Palm" at 108 revolutions and she was making about $13\frac{1}{2}$ knots. Therefore, she may have been making slightly less than $13\frac{1}{2}$ knots when she weighed 13,000 tons. On the day of the collision I don't know that, but I do know that she was mak- [675] ing about $13\frac{1}{2}$ knots with 108 revolutions.

Q. Mr. Dickie, what I am trying to get at is this, what is the formula by which you arrived at the momentum of the ship at 13,000 tons and 11,000 tons?

(Testimony of David W. Dickie.)

A. I did not calculate that.

Miss PHILLIPS: I think that is all.

Redirect Examination.

Mr. LILLICK: Q. Mr. Dickie, you were asked a number of questions by Miss Phillips relative to the projections upon the model of the "Chicago" that have been used in the tests and asked as to the result obtained by the gentlemen over in the swimming pool in Berkeley, and the major result in so far as we are concerned here is the diagram that has been introduced as Government's Exhibit No. 10 in connection with how the two vessels would have come to rest after the impact. The questions upon cross-examination were directed to the result assuming that the two models came into contact at relative speeds. I will ask you what would be the result of these projections which upon the model translated into some comparable projections upon the bottom of the "Chicago" would have meant three projections 6 feet in depth and 12 feet in length, relative to how the two models would have come to rest after impact. Would those projections have made any difference as to how they came to rest after the impact?

A. Yes, with projections like that on the original vessel, the "Chicago," she would not have come to rest in the same time as she would without the projections.

Q. And would, in your opinion, the results shown on Government's Exhibits 10 and 11 have

(Testimony of David W. Dickie.)

been results that we could depend upon relative to how those vessels would have come to rest after the collision?

A. With these projections upon the vessels then the vessels would not have come to rest the way they are shown on that Exhibit No. 10. [676]

Q. You were asked upon cross-examination whether the bow of the "Silver Palm" would have been bent to port if as she came into contact with the "Chicago" she was turning on a hard a-starboard helm. It is my recollection that your reply to that was that her bow would have been bent to port, but it would have been very slowly. Will you tell me what you meant by saying that it would have been very slowly?

A. The speed of the bow moving to port is very slow. I actually measured it and it was 3 feet in 5 seconds, about one-third of a knot an hour. So that any effect that the swing of the bow of the "Silver Palm" to starboard due to its helm being hard over would be negligible as compared with the speed of the "Chicago" going 5 or 6 knots an hour.

Q. Putting it specifically, Mr. Dickie, if at the moment of impact the "Silver Palm" was turning under a hard a-starboard helm could the result shown in the photostat that has been shown to you possibly have been obtained by that alone?

A. No.

Q. In the test which you made with the "Silver Palm" could you feel the ship vibrating when her engines went astern?

(Testimony of David W. Dickie.)

A. Yes, there was slight vibration.

Q. It has been called to my attention that I have been using the term "hard a-starboard helm" and "hard a-starboard rudder". What has been your understanding of my questions relative to what hard a-starboard helm and hard a-starboard rudder meant?

A. I assumed that you were referring to the new International Rules whereby hard a-starboard referred to a hard a-starboard rudder, in contradistinction to the old rule, where if you wished the same command you would say "Port the helm."

Mr. LILLICK: I might say all through this case that the witnesses on the "Chicago" and those on the "Silver Palm" have been using the term "hard a-starboard" for the direct order, or "hard right," which means under the new rules the rudder and [677] vessel both go to the right.

Miss PHILLIPS: I would like to say that the "Chicago's" witnesses used the term right or left rudder because it has been old in the Navy.

Recross Examination.

Miss PHILLIPS: Q. Mr. Dickie, do you mean to say that an obstruction or whatever you want to call it such as this, if proportionately large on the bottom of the "Chicago," that that would have materially affected the extent to which she swung?

A. No, what I said was this, that if an obstruction proportionately large according to that model

(Testimony of David W. Dickie.)

were put on the "Chicago" it would take longer to come to rest than if the obstruction were not there, or she would come to rest *sonner* than if the obstruction were not there.

Q. But would it be material, comparing that with the size of the enormous rudders that the "Chicago" has, would you say that a thing like that would be material?

A. I would say that it would be quite material.

The COURT: The point is this, taking the models as far as weights are concerned in proportion for this test, the only purpose of this test, as I understand it, was to ascertain whether when a force incident to the collision has been taken care of, the main force, that is, the force of impact has been taken care of, whether the relative position of the vessels assumed by the models, and you might refer that to the position of the main vessels, would it involve placing in somewhat the same direction or in opposite directions as you applied different forces of speed. Now, of course, it is true that the witnesses for the Government say that all of these other elements would have some effect, a difference in speed in going ahead or not going ahead, or whether there was a force put into motion which would take hold or be [678] effective in a certain number of seconds after the collision, but they contend that all of these elements you have been discussing with Miss Phillips, and which I am now discussing, while they would all have some effect on the relative posi-

(Testimony of David W. Dickie.)

tion of the ship, would not affect the ships as to which way, if a certain force is applied on the models, the models would be facing. Now, the only question is whether the difference would be of a small or negligible amount compared to main question as to what would happen with this speed and with this blow delivered at a certain angle, would the angle of impact be the same type on the models. Your belief is you could not test in any way even roughly this feature by the models: Is that what you mean?

A. Absolutely, you could not test it by the models and these ships take exactly the same position as the ships did in a regular orthodox collision.

Miss PHILLIPS: Your Honor did not mean to go into an orthodox collision, to go into an analysis of what other ships were doing?

The COURT: I wanted to get away from those elements that you were discussing. I said it was not claimed they would not have any effect, but it was contended that the main problem was not affected by these elements.

Miss PHILLIPS: Yes.

The COURT: I wanted to get Mr. Dickie's reply to the problem, these elements being represented as they were by the other witnesses, you feel that these elements are of such magnitude in connection with the collision, that is are of such value that you could not make a proper test with such elements not taken into consideration in models which are not the real form of the ships which are involved?

(Testimony of David W. Dickie.)

A. Yes, everything should be correct in every detail.

Q. It is not accurate enough to be taken into consideration in [679] tests of this type?

A. No.

Miss PHILLIPS: Q. You say that notwithstanding the fact that you have not performed any ship model tests in the last thirty years?

A. Yes.

Miss PHILLIPS: That is all.

Mr. LILLICK: That is all. May it please the Court, we have one matter yet to present to the Court involving the demand made upon us by the Government relative to the bell-books of the "Silver Palm" which were not in the home office in London. The affidavit that was presented to the Court and that is on file has been accepted by the Government as an explanation of the log books, both engine-room and deck, that we have turned over to the Government for inspection. Now, as to the bell-books which may be on the "Silver Palm." We cabled to Singapore and received a reply the day following—I thought I had that cable here but I have not it, but the substance of that cable was that they have bell-books on the "Silver Palm" and that they will be brought with the vessel when she comes, because if they attempted to mail them they would not be here before the vessel, itself, so that upon arrival of the vessel these bell-books and all of them will be turned over to the Government for inspection.

(Testimony of David W. Dickie.)

The COURT: When do you anticipate arrival of the vessel?

Mr. LILLICK: In the early part of May. Our plan is since this is practically the conclusion of our case on the navigational features to go on with the limitation proceedings at the convenience of the Court and counsel, either by deposition or otherwise. My own situation is that I am prepared to go on with a certain portion of our limitation proof which the Government is entitled to have before they put in their case; in other words, the burden is upon us and we propose to maintain that burden. So that subject to Miss Phillips' pleasure we will either go on by deposi- [680] tion or before the Court at the Court's convenience.

Miss PHILLIPS: I should say that the Government ought to put on its rebuttal on the navigational features first. Have you any more witnesses on that?

Mr. LILLICK: No. It may be necessary to put in surrebuttal. Mr. Sawyer has denied the Silver Line, Ltd. is a corporation. In view of the fact that the whole question involved in not only the navigational issues, but the limitation issues will be before your Honor for decision and unquestionably will all be submitted to the Court at the same time, I wish to have from Miss Phillips the right to put that proof in formally if Mr. Sawyer will not consent. I will be glad to have the Government's stipulation that the Silver Line, Ltd. is a British

(Testimony of David W. Dickie.)

corporation, duly incorporated under the laws of the Kingdom of Great Britain.

Miss PHILLIPS: Yes, I will so stipulate. I think, your Honor, we might as well proceed and finish our rebuttal on the navigational issues, and then we may go ahead with depositions on the limitation proceeding, and thereafter complete that evidence in court if need be. However, there is one man on the limitation proceedings that I would like to put on out of order because it is convenient to do so.

Mr. LILLICK: We have no objection, but as to the rest of that I think that can be completed by mutual arrangement between us.

The COURT: At this time you are going to complete the navigational features?

Miss PHILLIPS: Yes, I want to put on some more testimony.

Mr. LILLICK: One more thing, to complete our case, Miss Phillips was kind enough to send to me the figures on the plates on the side of the "Chicago," and I would like to read that into the record.

Miss PHILLIPS: I would suggest that that be given to the [681] reporter and let him copy it into the record.

Mr. LILLICK: I will be very glad to do that. May I hand this to the reporter and have it made a part of the record?

The COURT: So ordered.

(The document reads as follows:) [682]

(Testimony of David W. Dickie.)

CA29/L11-1 "COMMANDANT'S OFFICE

(27-241594) Navy Yard, Mare Island, California

EDA DB Jo

MAR. 15, '34

"United States Attorney

Northern District of California

San Francisco, California.

Subject: U. S. S. CHICAGO—Thickness of Plates
at the point of impact.

Sir:

Acknowledging your despatch of 14 March as follows:

'Please notify us by wire the thickness of the plates on the Chicago at the point of impact.

(Signed) McPIKE, U. S. Attorney,

"The following despatch was sent to you:

"1114 for Mr. McPike U. S. Attorney, San Francisco quote replying your inquiry thickness plates point of impact on Chicago shell plates at fore-castle deck one quarter inch at main deck one half inch and seven sixteenths inch at second deck three eighths inch and seven sixteenths inch at first platform seven sixteenths inch between first and second platform one half inch and three eighths inch at second platform seven sixteenth inch between second platform and inner bottom three eighths inch at inner bottom seven sixteenths inch at first longitudinal one half inch period deck plating fore-castle stringer five sixteenths inch and one quarter inch around turret three eighths inch main deck

(Testimony of David W. Dickie.)

one half inch seven sixteenths and three eighths inch second deck three eighths and one quarter inch first platform one quarter inch second platform five sixteenths inch inner bottom three eighths and five sixteenths inches letter confirmation follows unquote 1308.”

“The thicknesses given above for the various locations are of plates that were damaged by the impact and were given in the despatch in the following order for shell plating: [683]

“Beginning at the forecastle deck or highest deck at point of contact and working down through the various decks, inner bottom and first longitudinal, this latter being the lowest point damaged. Where two thicknesses are given, two fore and aft plates in the same strake were involved, having different thicknesses as given.

“For the various deck platings where two thicknesses are given, the larger applies to the plate on the deck next to the shell plating and the smaller applies to the plating on the inboard side of the stringer or heavy plate.

“On the inner bottom the 5/16” thickness is where the inner bottom connects with the second platform and the 3/8” thickness forms the inner bottom over the first and second longitudinals.

“Very truly yours,

Y. S. WILLIAMS,

Rear Admiral, U. S. Navy
Commandant.”

Mr. LILLICK: We rest on our navigational issues.

FRANK BARROWS FREYER,

Called for the United States in Rebuttal; sworn.

Miss PHILLIPS: Q. Will you give us your full name, please?

A. Frank Barrows Freyer.

Q. What is your occupation?

A. Captain, United States Navy.

Q. How long have you been in the Navy?

A. Since 1898.

Q. How long have you been a captain?

A. Since 1927.

Q. Will you state briefly, please, your professional training?

A. I graduated from the Naval Academy in 1902, sailed on board various ships in various capacities. I have had command of the U. S. S. "Glacier" while in the rank of Lieut-Commander, command of the U. S. S. "Oregon" when I was Lieutenant Commander. [684]

The COURT: What sort of a ship was the "Glacier"?

A. The "Glacier" was a converted merchant ship carrying supplies; on the "Oregon" as Lieut-Commander; I had command of the U. S. S. "Procyon," another converted merchant ship, and commanded the U. S. S. "Trenton," a light cruiser.

Miss PHILLIPS: I do not see attached to the depositions of the "Silver Palm" the exhibits. Have you got them here?

Mr. LILLICK: I did not know they were not attached.

(Testimony of Frank Barrows Freyer.)

Miss PHILLIPS: Perhaps we can proceed with photostat copies.

A. I have three here.

Q. Captain Freyer, will you give me those? I am going to show you, Mr. Lillick, what purports to be a photostat copy of Silver Palm Exhibit 1-Cox, a photostat copy of Silver Palm Exhibit 2-Cox, and photostat copy of Exhibit 3-Cox.

Mr. LILLICK: Just looking at them, I recognize them as being photostats of the originals. I think we will have no trouble in locating those.

Miss PHILLIPS: Q. Captain Freyer, have you read Captain Cox's testimony in reference to the three exhibits which I have just shown you, these photostats?

A. Yes.

Q. Have you plotted those three exhibits on a mooring board according to scale?

A. I have plotted those three exhibits shown separately, Silver Palm Exhibits 1, 2, and 3 Cox.

Mr. LILLICK: No objection to the photostats being used.

Miss PHILLIPS: Let us take this plot in the first place, what scale have you used?

A. The scale is 100 yards is equal to 1 inch.

Q. Have you plotted the sizes of the two ships according to this scale?

A. I have.

Q. Now, let us take the point that you have marked Position 1 for the "Silver Palm"—the

(Testimony of Frank Barrows Freyer.)

“Silver Palm” appears in red, does it not? [685]

A. Yes.

Q. Position 1, and at the bottom of the page is the position of Chicago No. 1. What does the first position represent?

A. That represents the position of the two vessels when the master of the “Silver Palm” said that he had sighted the “Chicago” as a blur 16 degrees on the starboard bow distant 2500 yards.

Q. Let us take Position 2 of each ship, the “Silver Palm” and the “Chicago,” what does that represent?

A. No. 2 represents the position of the “Silver Palm” three-quarters of a minute after position No. 1 at an average speed of 13.03 knots, with the “Chicago” at position 2, 26½ degrees on the “Silver Palm’s” starboard bow at a distance of 1800 yards.

The COURT: Of course, I have not read the depositions, and if any of this is data which has been given I wish you would let me know, because I don’t know now what is assumed and what is not.

Miss PHILLIPS: He is taking the testimony of Captain Cox as he gave it.

The COURT: In other words, he is taking the data furnished by Captain Cox in his deposition about his own vessel and the “Chicago”?

Miss PHILLIPS: Yes.

The COURT: In other words, this is a diagram based entirely on the testimony of Captain Cox?

Miss PHILLIPS: Yes.

(Testimony of Frank Barrows Freyer.)

Q. Going to the matter of speed of the "Silver Palm" between Silver Palm Position 1 and the collision point, which is position 3, what is the average rate of speed you gave her from 1 to 3?

A. $12\frac{1}{4}$ knots, based on the "Silver Palm's" speed at No. 1, being $13\frac{1}{2}$ knots, and position 3, being 11 knots.

Q. What average did you give the "Silver Palm" between her first position and her Position 2?

A. That was given at 13.03 knots, [686] which was three-quarters of a minute, equal to 326 yards in distance.

Q. Didn't you take the average of $12\frac{1}{4}$ knots there?

A. No, I took the distance between Position 1 and 2 on an average speed of 13.03 knots for three-quarters of a minute, and between Position 2 and 3 11.78 knots for one and a quarter minutes.

Q. Giving an average for the whole run of $12\frac{1}{4}$ knots, is that right?

A. Yes.

Q. Now, Position 3 represents the collision point, does it?

A. Yes.

Q. What angle of collision or impact did you give the two vessels—"the Silver Palm" hit the "Chicago" at what angle?

A. I can give that in just a minute. 35 degrees.

Q. And that is taken from what exhibit?

A. That is taken from "Silver Palm" Exhibit No. 3, Cox.

(Testimony of Frank Barrows Freyer.)

Q. Now, then, according to this plot the "Silver Palm" came how many yards between position 1 and 2?

A. 326 yards.

Q. And between Positions 2 and 3 how much did she make?

A. 491 yards.

Q. Now, taking the "Chicago" in her position from 1 to 2, what did she make?

A. 325 yards, which during three-quarters of a minute in time gave an average speed of 13 knots.

Q. Taking the "Chicago's" position between 2 and 3, according to this plot, what did the "Chicago" have to make to get from position 2 to the collision point?

A. The distance between "Chicago's Position 2 and 3 is 932 yards, which during one and a quarter minutes gives an average speed of 22.37 knots.

Q. In order to have the "Chicago" from an average speed of between Positions 1 and 2 of 13 knots to attain an average speed between 2 and 3 of 22.3 knots, can you state what speed the "Chicago" would have had to arise to attain an average of 22 and a fraction knots?

A. I cannot give that exactly, but it would have been [687] a speed of—if she had begun at position 1 at a low speed and had arisen at Position 2 so as to average 13 knots, then to have made 22 knots between Positions 2 and 3, it would have had to have been a speed certainly in excess of 22 knots,

(Testimony of Frank Barrows Freyer.)

that is revolutions in excess of 22 knots to have attained that speed.

Q. Suppose she were going between 1 and 2 at an average speed of 13 knots, and then from the position of 2, to reach an average of 22 knots between Positions 2 and 3, she would have had to have attained what speed?

A. The revolutions to have attained that speed, to have attained the average speed, I have not tried to work out, at all, but I would judge it would be revolutions for 25 or 30 knots.

Q. In order to get an average of 22 over the minute and a quarter?

A. Yes.

Q. Rising from 13 to 22?

A. Yes.

Miss PHILLIPS: Your Honor, I would like to offer in evidence this plot showing the maneuvers of the two vessels according to the Captain of the "Silver Palm."

Mr. LILLICK: I have no objection to the offer as being an offer of an exhibit made by Captain Freyer, but I wish it understood that the objection only runs to its being a plot of what actually occurred. I am not making any objection to the offer as an offer with respect to a check by Captain Freyer of what Captain Cox's testimony is.

Miss PHILLIPS: That is all I want it for. I only want it to demonstrate by a chart drawn to scale the maneuvers according to what Captain Cox said.

(Testimony of Frank Barrows Freyer.)

Mr. LILLICK: No objection.

The COURT: It will be received as Government's Exhibit No. 19.

Miss PHILLIPS: Just a minute. Mr. Freyer has just drawn my attention to the fact that this is the second sketch that I gave [688] him. That is, in this sketch he reduced the distance to 2000 yards. You explain it, Captain Freyer.

The COURT: You mean on the one that is being offered as 19?

Miss PHILLIPS: The exhibit just offered as Exhibit No. 19. I would like to withdraw it for a moment and have him correct what he testified there as to the distance.

A. The distances as given were in error. They were taken, in place of a distance of 2500 and 1800 yards, they were reduced to 2000 between Position 1 and a proportionate reduction between Positions 2 and 3.

Miss PHILLIPS: I really intended that as a second plot. In the first plot I intended to have Captain Freyer take up what Captain Cox said, just exactly as he gave it, 2500 yards, and the angles as he gave them. Now, let us take the distances as he gave them.

A. Might I add that the one that is now before us was made for the distances as given by Captain Cox. The other exhibits, of which there are three, including the one we have just had, the distance of

(Testimony of Frank Barrows Freyer.)

2500 yards was not taken, but 2000, and then 1500, and then 1000, to show what the results were with those distances.

The COURT: Now, this one that you are offering now is the one having the distance as estimated by Captain Cox?

Miss PHILLIPS: Yes.

The COURT: With his angles?

Miss PHILLIPS: The angles as he gave them.

A. Angles and distances as given by Captain Cox.

Q. In this exhibit you are now looking at, there is what distance between Position 1 of the "Silver Palm" and 1 of the "Chicago"?

A. 2500 yards distance.

Q. And what was the bearing?

A. The "Chicago" bore 16 degrees on the "Silver Palm's" starboard bow. [689]

Q. And that is taken from Captain Cox's first exhibit, Exhibit No. 1?

A. Yes.

Q. Now, the second position of the "Chicago" is fixed how?

A. That is by taking Position No. 2 as previously explained for three-quarters of a minute, and with the "Chicago" bearing $26\frac{1}{2}$ degrees on the starboard bow a distance of 1800 yards.

Q. Then for the "Chicago" to move from Position 1 to Position 2 how many yards would she have

(Testimony of Frank Barrows Freyer.)

to move forward in 45 seconds, according to Captain Cox's testimony?

A. The distance between "Chicago" 1 and 2 is 500 yards, which in three-quarters of a minute would give an average speed of 20 knots.

Q. And between "Chicago" position 2 and position 3, according to Captain Cox's testimony, the "Chicago" would have had to make how much?

A. 1300 yards, which in one and a quarter minutes would give an average speed of 31.2 knots.

The COURT: We will take an adjournment now until tomorrow morning at ten o'clock.

(An adjournment was here taken until tomorrow, Wednesday, March 28, 1934, at ten o'clock.) [690]

Wednesday, March 28, 1934.

Mr. LILLICK: May it please the Court: Yesterday we were asked for certain exhibits that had been introduced during the taking of certain depositions. When the depositions were taken, as they were at our office, it was by consent agreed that the exhibits there offered might be kept at our office until the trial of the case. I am now producing those exhibits, and in order that the record may show that they are before the Court we file U. S. Exhibit 4 Stanley, U. S. Exhibit 2 Cox, U. S. Exhibit Pitt, U. S. Exhibit 2 Stanley, U. S. Exhibit 3 Stanley, U. S. Exhibit 1 Stanley, Libelant's Exhibit 1 Puteh,

Silver Palm Exhibit 1 Cox, Silver Palm Exhibit 2 Cox, Silver Palm Exhibit 3 Cox, U. S. Exhibit 1 Cox.

We also wish to have the record show that the cable about which I spoke the other day, a copy of which I did not have, was sent, and I ask that the record show that on March 20, 1934, from San Francisco, California—

Miss PHILLIPS: That is all right, Mr. Lillick's word on that is sufficient, both as to the cable sent and the one he received.

Mr. LILLICK: The cable that was sent is: "Government requires all original bell and maneuver books deck engine since vessel's commission. What have you aboard? Advise if books could reach San Francisco prior your arrival."

To which we received the following telegram from Singapore:

"Your telegram of 20th instant deck engine room maneuver books unable to find complete set, retaining existing ones until arrival in San Francisco."

And at the date of vessel's arrival in San Francisco if I can get them on that day, and if not on the following day, we will deliver to the United States District Attorney the books that are on the vessel. [691]

Miss PHILLIPS: Thank you very much. Might I state that during the testimony of Lieut.-Commander Colton counsel asked the total weight of the revolving machinery, the rotating machinery in connection with the propellers. Mr. Colton did not have

the data, and it turned out he did not have it on board the ship. I have got it from the Mare Island Navy Yard, where the ship was built, and give it to Mr. Lillick Monday: Is that not correct?

Mr. LILLICK: Yes.

Miss PHILLIPS: May I at this time offer in evidence the deposition of Maharick Bin Latip, the helmsman of the "Silver Palm." This is a short deposition of Latip, taken as a witness for the United States; it followed his first deposition some ten days.

At the conclusion of my case, your Honor, I ask permission to offer in evidence the letters of administration of Mrs. Chappelle, the widow of Lieut-Chappelle. I have not yet received those from the East, and I will now ask permission to offer her letters of administration in evidence at the hearing before the Commissioner.

Mr. LILLICK: We have no objection.

Miss PHILLIPS: I am also asking permission to offer ancillary letters of administration in support of the claim of Mrs. Chappelle and Mrs. MacFarlane at the hearing before the Commissioner.

Mr. LILLICK: No objection.

Miss PHILLIPS: Yesterday afternoon at the close of the session Captain Freyer was on the stand. I would ask leave at this time not to proceed with Captain Freyer, but to take the testimony of two witnesses who are here from a distance. Captain

Freyer can easily complete his testimony at the close of the other two.

Mr. LILLICK: No objection. Might I also have the engineroom sheets for July 20, 1933 and the deck log for that date?

Miss PHILLIPS: Yes. [692]

Mr. LILLICK: We offer in evidence the engineer's bell-book for No. 1 engine upon the "Chicago" dated July 20, 1933, as our next exhibit.

The COURT: It will be Respondent's Exhibit 20.

(The document was marked "Respondent's Exhibit 20.")

Mr. LILLICK: Following that the engineer's bell-book for engine-room No. 2 dated July 20, 1933.

The COURT: It will be received as Respondent's Exhibit 21.

(The document was marked "Respondent's Exhibit 21.")

Mr. LILLICK: The engineer's bell-book for engine No. 3 on July 20, 1933.

The COURT: It will be received as Respondent's Exhibit 22.

(The document was marked "Respondent's Exhibit 22.")

Mr. LILLICK: The engine-room bell-book for engine No. 4 on July 20, 1933 in the "Chicago."

The COURT: It will be received as Respondent's Exhibit 23.

(The document was marked "Respondent's Exhibit 23.")

Mr. LILLICK: Also the sheet from the deck log of the "Chicago" for Thursday, July 20, 1933.

Miss PHILLIPS: Your Honor, at this time I will renew the objection that I made when counsel was cross-examining Lieut.-Commander Colton with respect to that entry, the entry being one from the deck log upon which the witness on the stand had no knowledge or information. I think perhaps your Honor might reserve a ruling, let the exhibit be offered and reserve a ruling so we need not argue about the point now and save time.

The COURT: That is the deck log?

Miss PHILLIPS: That is the rough deck log of the "Chicago" for July 20. Mr. Lillick examined Lieut.-Commander Colton in connection with the engine bell-books of the same date as to that.

The COURT: It will be received as Respondent's Exhibit 24, [693] subject to that reservation.

(The document was marked "Respondent's Exhibit 24.")

WESLEY McLAREN HAGUE,

Called for the United States in Rebuttal; sworn.

Miss PHILLIPS: Q. Will you give your full name?

A. Wesley McLaren Hague.

Q. What is your occupation?

A. I am a naval constructor, United States Navy.

Q. What is your rank?

A. Lieutenant.

Q. Will you please state how long you have been in the Navy?

A. I have been in the Navy for eighteen years.

Q. Will you state your professional training?

A. I graduated from the Naval Academy, one year post-graduate at the Academy, and two years post-graduate work with the Massachusetts Institute of Technology.

Q. Will you state what experience you have had, if any, in the repair of ships?

A. I was four years at the Navy Yard at Puget Sound, four years in Balboa in charge of marine repairs, and a year, approximately, at the Navy Yard at Mare Island.

Q. What experience have you had in the construction of ships?

A. I have never been engaged in the new construction of any large ships. I have designed and built a couple of boats for the Panama Canal and a

(Testimony of Wesley McLaren Hague.)

couple of tugboats, and tenders, but I never actually built large ships.

Q. In your experience in the various Navy Yards that you have mentioned, will you state whether your experience has been limited to the repair of warships or whether it has also included merchant vessels?

A. The Panama Canal Yard at Balboa, of course, is not a Navy Yard. It is, to all intents and purposes, a commercial yard, [694] and perhaps 33½ per cent of it was on merchant vessels, probably 50 per cent was merchant vessels in the form of dredging machines, and the remainder was Navy craft in the vicinity.

Q. Did you have any actual experience in the repair of merchant vessels down at Balboa?

A. Yes.

Q. Referring to the cruiser "Chicago," will you state what you had to do, if anything, in repairing the "Chicago" after the collision with the "Silver Palm"?

A. I have been in charge of the actual repair of the "Chicago" since the "Chicago" arrived at the Navy Yard until she left last Saturday.

Q. Did your duties require you to go on board the "Chicago" and examine the damaged area?

A. Yes.

Q. Have you a plan showing the damaged area of the "Chicago"?

A. Yes.

(Testimony of Wesley McLaren Hague.)

Q. Will you get it out, please, and spread it out on the table for the Court so that he can follow you?

A. Yes.

Q. What is the scale upon which you have drawn that plan?

A. The scale is one-quarter of an inch to the foot. Might I remark that I have laid it this way because this is the port side of the vessel and this is the starboard side.

Q. That is, the bottom of that represents the port side of the "Chicago"?

A. This is really the top of the ship as far as the legend is concerned.

Q. If it is clear enough it will not need any explanation.

The COURT: As a matter of fact, this legend is apparently at the bottom?

A. Yes, the legend is at the bottom, and I have laid it here because it seemed more natural that the bow should be there. It does not make any difference.

Miss PHILLIPS: I want you to explain the various lines and colors which appear upon that chart.

A. This is a plan looking directly down on the ship. It shows the lines of the decks. This is the forecastle deck. [695]

(Testimony of Wesley McLaren Hague.)

Q. Don't say "this," use the colors, so that it will be in the record. When you say "this" it does not mean a thing in the record.

A. The outside heavy line—

Q. In what color?

A. In black, is the forecastle deck. It is marked so.

The COURT: Q. You have marked it so?

A. Yes. The next line toward the center, a black dotted line, represents the main deck, and is so described. The next line inboard with *with* double dots represents the second deck, and it is so marked. The next line inboard with triple dots represents the first platform deck, and it is so marked, and the next line inboard with quadruple dotted lines represents the second platform deck, and is so marked. The circle represents the barbette of turret No. 1 of the "Chicago," 60-pound special treatment steel.

The COURT: What did you say it was?

A. 60-pound, 1½ inch plate.

Q. What is the size? You say it was 60-pound 1½.

A. 60 pounds is the weight of one square foot of plate, 1½-inch plate.

Q. That is what I thought you meant but you did not say that.

A. I probably will speak in poundage a lot, because that is the Navy usage. The heavy dotted line indicates the armor between the first and second platform decks.

(Testimony of Wesley McLaren Hague.)

Miss PHILLIPS: Q. Is it so marked?

A. It is marked as $3\frac{3}{4}$ -inch special treatment steel, bulkhead between first and second platform deck. Across between the two bulkheads of side armor we have an athwartships bulkhead of $3\frac{3}{4}$ -inch special treatment steel, connecting the two. Over on top on the side of this box so formed is armor and that is 80 pounds in weight, that is 2 inches. That is not marked on this plan. I might put it in pencil.

Q. Here is a red pencil which you may use. Perhaps ink would be [696] better.

A. I will put it in pounds, the box is 80 pounds 2-inch thick, S. T. S. special treatment steel. Rising from this box we have an ammunition hoist, which is marked on the plan. That rises from the top of the box on the first platform deck on up to the forecastle deck of that ship. The thickness of that is 60 pounds $1\frac{1}{2}$ inches thick. Between the forecastle deck, which is the topmost deck of the "Chicago" and the main deck of the "Chicago" we have another armored handling room connecting this ammunition hoist with the turret. This is indicated on the plan by heavy lines marked $1\frac{1}{2}$ -inch S. T. S., between the main and forecastle deck. There are two more lines marked "Bulkhead No. 21" in dotted lines; across the face of a large armored box is one of the main transverse bulkheads of the ship, which is a dotted line; marked "Bulkhead $23\frac{1}{2}$ " is a second one of the main transverse bulkheads of the ship.

(Testimony of Wesley McLaren Hague.)

Bulkhead 23½ is not only a water-tight bulkhead, but below the second deck supports the weight of the bulkhead and the re-action when the turret fires, and has been built extra strong. That covers the salient features of the "Chicago's" structure. The other lines that I have caused to be drawn in here were drawn from our records at Mare Island, and show the lines of cleavage of the damage on the "Chicago." First in black we have the forecastle deck cleavage, which runs from about Frame 12 in a diagonal line, almost to the center line, bends around the upper handling room, this armored spot that I have spoken of follows the line very closely down to the turret barbette and finally comes out to the side at about Frame 26. The next deck is the main deck. This line of cleavage is shown in red. It starts in with the same general direction from about Frame 16 to Frame 20, bends around a corner of the upper handling room, bends on into about Frame 23 and then out to the side of the ship. The next deck down is the second deck. This is shown in blue. It comes in about the corner [697] of the ammunition hoist. You will remember that this upper handling room does not extend below the main deck. That explains why the line of cleavage comes in to the ammunition hoist of the second deck.

The COURT: Underneath it?

A. Yes. That extends almost to the center line at about Frame 22½ and then comes out sharply, almost at right angles to the center line of the ship.

(Testimony of Wesley McLaren Hague.)

Next we have the line of the first platform deck shown in yellow. This starts in with the same general direction of the deck above, but here we encounter the very heavy armor encompassing the lower handling room, the armor box that I have spoken of, and we find this line of cleavage comes to the corner of the ammunition box, following right along the bulkhead to about Frame 23, and then sharply out to the side. Similarly, for the second Platform deck, which is in green on this sketch, we come in approaching the armored spot and out to the side of the ship at about Frame 22½.

Q. Mr. Hague, looking at Government's Exhibit 2-D, can you pick out for his Honor the ammunition box that you have referred to on that sketch and marked it in ink with the letters A-B?

A. I will draw an indicating arrow at the bottom A-B on the ammunition hoist. Now, the ammunition hoist actually extends into this upper handling room, but, of course, cannot be seen on account of the upper handling room bulkhead. It cuts it off here as though it stopped at the main deck.

Q. Mr. Hague, have you examined Respondent's Exhibit No. 18, that is the sketch prepared by the witness Dickie, showing the lines of cleavage, let us say, upon the "Silver Palm"?

A. I have.

Q. Is your map or plan of that deck damage drawn to the same or a different scale as Exhibit 18?

A. Drawn to the same scale.

(Testimony of Wesley McLaren Hague.)

Q. Will you look at that rather straight line marked on Exhibit [698] 18—I believe it is marked with the letters D-Z.

A. Yes.

Q. Now, is there anything in the interior of the “Chicago” which fits or explains this straight line D-Z on Silver Line Exhibit 18?

A. I understand the line D-Z represents the condition between the second and third decks of the “Silver Palm” at that height, and might I show a sketch that I prepared last night of the various heights of the two ships?

Q. Yes.

A. I apologize, I did not have time to ink it in, but from the information that was given to me on the back of this sketch—

Q. Let us have the information in the record from which you prepared that sketch.

A. Second deck, red line, was approximately 40 feet above the keel. This refers to the “Silver Palm.” The damage shown in red line extends down just to No. 3 deck. Height between No. 2 and No. 3 deck 9 feet. Center of anchor is 5 feet from stem and five feet below forecastle deck. Top of forecastle deck from keel is 55½ feet. Center of anchor to keel line is 50½ feet. Might I add, draft forward of “Silver Palm” 23 feet, draft at damage “Chicago” 19 feet. These are approximate drafts, but are very close, as I understand the testimony

(Testimony of Wesley McLaren Hague.)

here, as brought out. On that basis I drew this sketch of a cross section of the "Chicago," and a provisional of the "Silver Palm" so that we might be able to picture the height of the various structural members involved. May I have the question read again of the District Attorney?

Q. Yes, my question was is there anything in the interior of the "Chicago" which would fit in or explain straight line D-Z on Silver Palm Exhibit 18?

A. This line D-Z is somewhere between the second and third decks of the "Silver Palm"; in other words it is approximately at the second deck level of the "Chicago." [699] Now, if we take this Exhibit of the "Silver Palm" and fit it into the cleavage line of the "Chicago" we find a very close fit between the two. Here we have the straight cleavage line of the "Chicago".

Q. Did you say cleavage line of the "Chicago"?

A. Cleavage line. This is the blue line that comes directly out here on the second deck. This bulge from Z to R is lying outside of the shell plating of the "Chicago." That undoubtedly was the position of the two vessels at one moment during the collision.

Q. Now, the line D-Z, that straight line of cleavage on the "Silver Palm," fits in with what line, if any, on the "Chicago"?

A. It fits in with the line of cleavage from the second deck on up to the main deck, and that in

(Testimony of Wesley McLaren Hague.)

turn runs parallel with bulkhead 23½, which I have pointed out before was one of the main transverse bulkheads of the ship. It runs fairly parallel to bulkhead 21, which I have pointed out was water tight and a strong bulkhead. What happened in that place was that the "Silver Palm" came in, carried away Bulkhead 21, due to the force of the impact, bashed it back against bulkhead 23½, and the pressure of all this wreckage piling up against the bow of the "Silver Palm," the "Silver Palm" coming in, pushed the "Silver Palm's" bow from starboard to port, and they lay in there until, due to the dynamic reaction, the "Silver Palm" moved out or the "Chicago" swung away, which ever way you want to look at it.

The COURT: Either or both?

A. Yes

Miss PHILLIPS: Q. Was this main bulkhead that you have referred to as Bulkhead 23½, that transverse bulkhead, damaged?

A. That bulkhead was only damaged between the second and main deck; it was bent; between the main deck, and the forecastle deck where it was no water-tight bulkhead, and no longer strong, it was bashed completely back. I would like to point out that the "Chicago" is quite a sturdy ship from the main deck down. However, [700] between the main deck and the forecastle deck the plates are light, her frames are light, so that it is not at all surprising to find this big cut in the forecastle deck and this

(Testimony of Wesley McLaren Hague.)

big damage up above, but as we go on down every hard spot, and by "hard spot" I mean a stiff, strong spot on the "Silver Palm" that encountered a soft spot on the "Chicago" went away in, and every hard spot on the "Chicago" was encountering a relatively soft spot on the "Silver Palm" stopped this damage at that spot. That is very clearly shown here when it is considered that the fore-castle deck between the main and the fore-castle deck, we have everything soft until we hit the upper handling room, there, and the damage absolutely stopped. The armor was not damaged at all on the handling room, although due to leverage pressure the gun mount was somewhat damaged. As we go on down, the next hard spot on the "Silver Palm" is the main deck, which came in between the main deck and the fore-castle deck of the "Chicago." That came in until it hit this ammunition hoist and stopped. The next hard spot on the "Silver Palm" was the second deck, which was the top of the "Silver Palm's" fore-peak tank. That went in with nothing to stop it, until it got in this hole between the ammunition hoist and the turret mount, and caused the deeper penetration, and then another spot, immediately below the second deck, in the neighborhood of 7 or 8 feet, we find the second deck of the "Chicago", which is an extremely hard spot. Coming on down to the first platform deck of the "Chicago" into an armored spot, we find that the "Silver Palm" came up against it and no damage was done,

(Testimony of Wesley McLaren Hague.)

scratches on paint work, etc., but no structural damage.

Q. Was there any packing up of wreckage against this main transverse bulkhead that you have described as 23½?

A. It was packed in there in folds so tightly that I missed my estimate for cutting it adrift with torches. I estimated eight hours and it actually [701] took me twenty-four hours to cut it through.

Q. Could you compare this bulkhead with the strength of the "Chicago's" side plating?

A. The bulkhead 23½ is probably better able to withstand a blow than the side plates of the "Chicago." I should say that the bulkhead 21 was about equally capable of withstanding a blow. The side plating on the "Chicago" was heavier than the bulkhead plating, but the stiffeners on the bulkhead were closer-spaced than the framing of the side plating.

Q. What was the angle of impact as shown by the lines of cleavage on the "Chicago"?

A. The angle of impact must have been about 40 or 45 degrees.

Q. Are these lines of cleavage on the "Chicago" consistent with the "Chicago's" being at rest, or nearly at rest at the moment of impact?

A. Yes.

Q. Will you explain why?

A. My picture of the damage is as the "Silver Palm" came at an angle of impact of 45 degrees or

(Testimony of Wesley McLaren Hague.)

40 degrees, if the "Chicago" were at rest the angle between the axes of the two ships would be also 40 and 45 degrees. As they came in the bow of the "Silver Palm" hit the side of the "Chicago," and the "Chicago" would first heel and then start to turn away something like that. The "Silver Palm" coming on in, the "Chicago" turning away, that would finally get down to this position that I showed before with the line D-Z on the "Silver Palm" exhibit parallel with the bulkhead $23\frac{1}{2}$, and at an angle somewhat greater than 40 or 45 degrees angle of impact, an angle say of 70 degrees. As that continued I imagine the "Chicago" continued to starboard and the "Silver Palm" to port, until they lay alongside of each other approximately parallel.

Q. Mr. Hague, if the "Chicago" were moving ahead at 5 to 6 knots and if the "Silver Palm" were moving ahead at 7 to 8 knots, do you [702] know what angle between the axes of the two ships would be required to produce these lines of cleavage as shown in your diagram of the "Chicago"?

A. It would require that the angle between the axes of the two ships should be something like 70 degrees, because with the motion on the "Chicago," the relative motion of the two then would be approximately 40 degrees, the line of impact shown by the cleavage; then if the "Silver Palm" came in at 70 degrees and struck the "Chicago", the "Chicago"

(Testimony of Wesley McLaren Hague.)

heeling and turning to starboard away from the blow, then we would find this line D-Z run across say from the corner of the upper handling room to the side of the ship, with nothing to explain why the wreckage of the "Chicago" had been bashed at the main bulkhead 23½.

Q. Is there anything in the internal structure of the "Chicago" which, in your opinion, would turn the "Silver Palm's" bow to port if the "Chicago" were at rest?

A. Oh, yes, it could not help but be turned to port. The "Silver Palm" is coming into a hard spot on her starboard bow caused by bulkhead 21 and 23½ and with no pressure on the port bow it is turning away, due to the blow.

Miss PHILLIPS: I would like to offer in evidence this plan of the damage shown by Mr. Hague and ask that it be marked Government's Exhibit next in order.

The COURT: It will be received as U. S. Exhibit 20.

(The document was marked "U. S. Exhibit 20.")

Miss PHILLIPS: Q. Mr. Hague, have you prepared a sketch of the "Silver Palm" damage on the same material as that sketch of yours?

A. Yes.

Q. Where did you get that sketch that you prepared?

A. I made a tracing from the "Silver Palm" exhibit and transferred that tracing which was made

(Testimony of Wesley McLaren Hague.)

on such paper as we could find in the building to tracing cloth. [703]

Miss PHILLIPS: I am going to offer this tracing of the "Silver Palm."

A. It may be checked here now. I have never had an opportunity to check it.

Q. If there is no difference at all, it is more durable than the original Exhibit 18, and I was going to suggest to use it if you thought it would stand up under wear, but I would rather not. Just forget that. I also offer in evidence Mr. Hague's sketch of the two ships, cross section of the two ships, as Government's Exhibit next in order.

The COURT: It will be received as Government's Exhibit 21.

(The document was marked "U. S. Exhibit 21.")

Cross Examination.

Mr. LILLICK: Q. Mr. Hague, you gave us certain drafts of the two vessels, 19 feet, I think, was one. What was the other?

A. 23 feet for the "Silver Palm."

Q. Where did you get those drafts?

A. From Miss Phillips.

Q. Do you know anything about the draft of the "Chicago" at the time of the collision?

A. Only from Miss Phillips' information, which she said had been brought out in evidence.

Q. So that if those drafts are incorrect, the relative positions on the diagrams that you have indicated with reference to where the first and second

(Testimony of Wesley McLaren Hague.)

decks of the "Chicago" struck the first and second decks of the "Silver Palm" would not be correct, would they?

A. They would be incorrect by the amount that the drafts were incorrect only.

Q. Do you know whether the bow of the "Chicago" was overhanging?

A. Yes.

Q. How much?

A. The bow of the "Chicago" overhangs some 18 feet.

Q. How about the bow of the "Silver Palm"?

A. I don't know.

Q. Have you any knowledge of the character of the stem of the [704] "Silver Palm" with reference to whether it was directly vertical?

A. Perpendicular to the base line?

Q. Yes.

A. No, I have not. From such pictures which were incomplete as I have seen it would appear almost vertical.

Q. So that you would say that the stem of the "Silver Palm," when it came in contact with the side of the "Chicago" was in practically a perpendicular position?

A. Practically, yes.

Q. What would you say as to the overhang of the "Silver Palm"—you know nothing about that?

A. No.

(Testimony of Wesley McLaren Hague.)

Q. So that if she had a flaring bow coming up and over, tied in with the stem in front, you could not tie that in in any way with your drawing, could you?

A. I do not understand your question.

Q. If the bow of the "Silver Palm" be a bluff and overhanging bow and assuming it was not in the perpendicular position which you are assuming, the upper portion of the "Silver Palm" would have contacted the side of the "Chicago" first, would it not?

A. The upper part of the "Silver Palm's" bow was bound to contact the side of the "Chicago" first unless she were a whaleback.

Q. Because in part the "Chicago," herself, has a flare at that part above the bow?

A. The "Chicago" has a flare outside the plating.

Q. How much is the flare, would you say?

A. From what point?

Q. From the point of the forecastle deck.

A. You see, this section that I have shown is a perfect picture of the side of the "Chicago." Now, the side of the ship is a curved line, and you might find that the forecastle deck on the "Chicago" dropped at that point, you might say, for a width of 16 or 17 feet, where on the main deck immediately below it it would only maybe for 15 feet and lower deck 14 feet.

Miss PHILLIPS: I just want to direct attention to the fact that there is a model in court drawn

(Testimony of Wesley McLaren Hague.)

absolutely to scale [705] and if counsel wants to save a little time the model is here.

MR. LILLICK: I am conducting the cross-examination as I think it should be. Perhaps you can tell me how far out from the water line on the "Chicago" a plummet dropped from the outer edge of the forecastle deck would hit the water?

A. I should say—this is a guess pure and simple—about six or seven feet.

Q. So that at the water line, in your opinion, although you say it is a guess, the flare of the "Chicago" is six or seven feet?

A. Yes.

Q. Does that continue on under water?

A. No.

Q. So that at the water line you would say, drawing the water the "Chicago" did that day for the balance of the distance below the water that the side was flush?

A. It goes the other way with the water line, the beam below water is greater than the beam at the water line, but only slightly, a matter of six or seven inches.

Q. Since you know nothing about the bow of the "Silver Palm" I suppose you cannot give me any idea of how far the overhang on her bow would be?

A. No.

Q. Do you know, lying water as the "Silver Palm" and the "Chicago" would have been in still

(Testimony of Wesley McLaren Hague.)

water at the time of the collision, and before the impact, how far above the forecastle deck of the "Chicago" the forecastle deck of the "Silver Palm" would have been?

A. The forecastle deck of the "Silver Palm," itself?

Q. The top deck.

A. The forecastle deck, itself, would be two or three feet.

Q. The top portion.

A. From the pictures I have seen a bulwark above the deck. That is of course usual merchant ship construction.

Q. Let us take the top of the stem, which of course would be straight up to the top of the bulwarks.

A. I have no information as to the height of the bulwarks. My recollection of the sketch that I made on the yellow paper led me to believe that the top [706] of the bulwark plate on the "Silver Palm" would be about ten feet above the forecastle deck of the "Chicago".

Q. So that when the two vessels came in contact you would say that the topmost portion of the "Chicago" struck by the "Silver Palm" would have been at a point ten feet below the top of the stem of the "Silver Palm"?

A. At the moment of impact, yes, and then there was a bun mount she was striking.

Q. You mean after penetration?

A. After penetration, yes.

(Testimony of Wesley McLaren Hague.)

Q. How deep?

A. How deep a penetration?

Q. Yes, before it would go up against that.

A. If I could scale it off the plans I have I could give it to you very accurate.

Q. I want your best opinion now, unless you can do it very quickly. Can you do it quickly, Mr. Hague?

A. I wish you would look at these plans, these are confidential plans and cannot be offered in evidence.

Q. That is perfectly all right, we will take your statement with respect to it.

A. There would be a diagonal penetration of seven feet.

Q. Seven feet?

A. Yes.

Q. Before the stem of the "Silver Palm" would come in contact with it?

A. With the gun, the left-hand gun of Mount No. 1 on the "Chicago."

Q. And below the main deck these two vessels would, if I may roughly state this, from the point where they came in contact and penetrated gradually break into each other so that the stem of the "Silver Palm" would have kept going into the hull of the "Chicago" in that relative way that I am doing it, stem hitting and going in in that position until she brought up against this gun.

A. You have said main deck. Now, I think you mean forecastle deck.

(Testimony of Wesley McLaren Hague.)

Q. I understood from you that the "Silver Palm's" stem at the top [707] was 7 feet above any resistance—

A (Interrupting) Forecastle deck.

Q. Any resistance upon the "Chicago."

A. Yes.

Q. And that when that stem brought up on this gun it was 7 feet inside the outside line of the "Chicago."

A. Yes.

Q. I ask you whether that is not true, that the penetration of the "Chicago" with the—I do not want to call it "gingerbread" material below—the light plating below the forecastle deck would have gone straight in in that fashion until it brought up against the gun?

A. That is the only place where there is anything that might be called gingerbread, but before it—no—it would continue on until it came up against the gun yes.

Q. So that the stem of the "Silver Palm" in penetrating the side of the "Chicago" would come into contact first with the gun: Is that right?

A. No. The stem is a long bar that extends from the keel line clean up to the top of the ship. The stem of the "Silver Palm" first came into contact with the forecastle deck head of the "Chicago."

Q. As I understand you, going in say 7 feet inside the outside line of the "Chicago" before it brought up against this gun?

(Testimony of Wesley McLaren Hague.)

A. Before the upper part of the stem brought up against the gun.

Q. What was the thickness of the plating on the "Chicago" where the stem of the "Silver Palm" first came in contact with it?

A. About 10 pounds, one-quarter of an inch.

Q. One-quarter-inch plating. May I ask you on your diagram Exhibit 20 to indicate on the forward line of the forecastle deck where you have your heavy line, the place where the plating was quarter-inch?

A. The plates of the "Chicago" throughout this damaged area between the main and forecastle deck are a quarter of an inch thick.

Q. Will you with your ruler put a quarter of an inch up here so [708] we can see on your diagram what the thickness of these plates was?

A. This is, of course, a full scale.

Q. Will you mark it "Thickness of Chicago plating"?

A. "Thickness of Chicago shell plating between forecastle and main deck."

Q. Now, so that we may understand it, you have so elongated your diagram that from a draftman's standpoint it is a very simple thing, no doubt, but the one-quarter inch is from the forward to the after end?

A. On the straight line set off by small straight lines.

(Testimony of Wesley McLaren Hague.)

Q. What was the distance between the fore-castle deck and the main deck down?

A. That varies. I can give you those things exactly.

Q. Let us have it.

A. From my sketch I can give it to you.

Miss PHILLIPS: It is marked on the sketch.

Mr. LILLICK: Let us take it at the first point of impact.

A. The distance between the fore-castle deck and the main deck is nine feet.

Q. So that for nine feet in depth the plating was one-quarter of an inch thick?

A. Yes.

Q. Below the main deck to the second deck what was the size of the plating?

A. You understand that plating does not extend from deck to deck. We never have the seams of the shell plating land at the deck, but in general the thickness of shell plating between the main and the second deck on the "Chicago" is 20 pounds or one-half inch.

Q. I want it at the point of first impact indicated opposite—is that frame 21?

A. That is frame No. 12.

Q. What was the thickness of the plating between the main deck and the second deck at that point?

A. The thickness of the plating between the main and the second deck at the point of contact between

(Testimony of Wesley McLaren Hague.)

the "Silver Palm" and the "Chicago" was 20 pounds or one-half inch. [709]

Q. What distance was it between the main deck and the second deck?

A. The distance between the main and second deck is 8 feet.

Q. So that for the first nine feet it was $\frac{1}{4}$ inch and the next 8 half inch?

A. Yes.

Q. Will you just put there "Half inch"?

A. Yes.

Q. Between the second deck and the first platform deck what was the thickness of the plating?

A. Between the second deck and the first platform of the "Chicago" the thickness of that plating was $17\frac{1}{2}$ pounds, $\frac{7}{16}$ of an inch.

Q. Will you let me have that, please, on there?

A. Yes.

Q. Vertically, how far down did that extend?

A. That deck is 8 feet and 6 inches.

Q. 8 feet and 6 inches?

A. Yes.

Q. And the deepest portion of the cut upon the "Chicago" was down at the second platform deck, was it?

A. At the second deck.

Q. It is marked on your diagram, as I see it, "Second platform deck". I am perhaps in error.

A. This is the deepest portion of the cut, the blue line, second deck.

(Testimony of Wesley McLaren Hague.)

Q. I am speaking of it from the point of looking down.

A. This is the second platform deck.

Q. So that the damage looking down into the second platform deck—what is the thickness of the plate between the first platform deck and the second platform deck?

A. The damage did not end at the second platform deck.

Q. Then your diagram does not show that portion of the cut?

A. The diagram shows the upper line of the damage below the second deck, in other words the place of the damage at the second deck, but does not show the damage to the double bottom below the second deck.

Q. The damage shown on your diagram does not extend below the second platform deck?

A. No. [710]

Q. How far from the point of first impact on the side of the "Chicago" is it in a straight line to bulkhead 21?

A. I do not claim that the first point of impact came at Frame 12.

Q. Where did the first point of impact come?

A. In my opinion the first point of impact came at approximately Frame 17.

Q. Will you indicate that upon your diagram?

A. Yes.

(Testimony of Wesley McLaren Hague.)

Q. Digressing for a moment, Mr. Hague, I show you United States Exhibit No. 2, F, and I call your attention to the apparent scratching of the paint from the point near the port light to the edge of the plating. What caused that, would you say?

A. That was caused as the bow of the "Silver Palm" entered the "Chicago."

Q. What is the line to which I am pointing?

A. That is the heavy vertical armored bulkhead extending between the first and second platform decks and between Frame 21 and 23½, forming the port boundary of the lower handling room, for No. 1 gun mount, on the "Chicago."

Q. How far inside the shell plating on the "Chicago" is that? Is it flush with the plating?

A. No.

Q. How far is it inside?

A. On the level of the second platform deck it is 5 feet 3 inches. On the level of the first platform deck it is 5 feet 7 inches.

Q. So that the "Silver Palm" had to penetrate the side of the "Chicago" between 5 and 6 feet before it came in contact with that heavy armor plate: Is that right?

A. Yes.

Q. You have not answered the question I asked you, because you took exception to my mentioning the point opposite Frame 12 as the point of first impact. Let us not call it the point of first impact,

(Testimony of Wesley McLaren Hague.)

but the point at which the shell plating of the "Chicago" was sheared squarely in two, and tell me how far it is from that point to the armor plate marked by Bulkhead 21?

A. The distance between the point of damage at approximately frame 12 of the shell [711] plating at the level of the forecastle deck of the "Chicago" and the corner of the upper 8-inch handling room, and also at the forecastle level is 37 feet.

Q. You apparently took exception to my phraseology with respect to the shearing off of the plates at the forward end of the impact. Would you not call that a clean-cut point to the forward portion of the cut in the side of the "Chicago" on U. S. Exhibit 2-F?

A. Yes.

Q. Will you upon 2-F indicate to me the point which on your diagram is known as Plate 12?

A. That point is not shown on 2-F.

Q. It is even forward of the gash shown here on the exhibit?

A. Yes.

Q. The ammunition hoist was not in any way damaged, was it?

A. No, structurally it was not damaged.

Q. Indeed, there was hardly a scratch upon it, was there?

A. There were scratches on the paint work, in fact, it had to be repainted, but no heavy rubbing.

(Testimony of Wesley McLaren Hague.)

Q. I call your attention to U. S. Exhibit 2-I, and ask you whether the box-like upper structure to which I am pointing is not the ammunition hoist.

A. Yes.

Q. Where on this picture, if you can show it, is the point upon your diagram of bulkhead 21 with the corner which I am unable to designate?

A. The corner of the bulkhead 21 and the fore-and-aft armored bulkhead is obscured by the shell plating. It is approximately back of that point and back of this point.

Miss PHILLIPS: May we have that marked? "That point" and "this point" does not show up in the record.

A. I will call that point A and the second point B.

Mr. LILLICK: Q. Now, as I understand you, this corner which you have referred to as the corner of bulkhead 21——

A. (Interrupting) And the fore-and-aft armored bulkhead.

Q. The fore-and-aft armored bulkhead was not damaged, was it? [712]

A. No, it was not structurally damaged to the point where we deemed any corrective measures necessary.

Q. In other words, such portion of the prow of the "Silver Palm" as brought up against that had to be folded up or broken or moved out of the way?

A. It was probably pulverized.

Q. It was probably pulverized?

A. Yes.

(Testimony of Wesley McLaren Hague.)

Q. I call your attention to U. S. Exhibit No. 2-I, and your indication of where that bulkhead is, and ask you whether you can tell me what portion of the "Silver Palm's" stem, if any portion of it, entered the cut between those two points.

A. There is no known mark or point of departure to the "Silver Palm" that I can designate as being the part of the stem that entered the cut. It was a portion that was in the forepeak tank somewhere below the water line.

Q. How far below the deck of the "Chicago," the forecastle deck, is this corner about which we are talking, from the forecastle deck down?

A. To the top of the junction between bulkhead 21 and the fore-and-aft armored bulkhead, and from the forecastle deck of the "Chicago", is 26 feet.

Q. How far above the water line, if at all, is the top of that armored plate and bulkhead?

A. The top of that armor plate and bulkhead at the time of the collision was three feet above the water line of the "Chicago."

Q. So that impinging, if that be the proper word, the stem of the "Silver Palm" upon it, if it ever came in contact with that, you would say that contact would have been how far up on the stem of the "Silver Palm" from the water line of the "Silver Palm"?

A. It should show in the neighborhood of three or four feet.

Q. Above the water line?

A. Above the water line.

(Testimony of Wesley McLaren Hague.)

Q. I call your attention to Respondent's Exhibit No. 14, which is a photograph of the "Silver Palm" after she was placed in dry dock [713] at Moore's, and ask you to indicate upon that what, in your opinion is three feet above the water line of the "Silver Palm"?

A. I have no scale to go by.

Q. So you are unable to tell me?

A. No.

Q. I show you U. S. Exhibit 3-D, offered by the Government as a photograph of the "Silver Palm" as she was lying at Pier 46 in San Francisco immediately after she came in port, subsequent to the collision, and ask you whether upon that picture you can tell me where 3 feet above the water line of the "Silver Palm" would be.

A. No.

Q. You cannot tell me?

A. No.

Q. What do you know, Mr. Hague, of the draft of the "Silver Palm" at the time of the collision?

A. Only what I have been told, that it was approximately 23 feet forward.

Q. And with this Government's exhibit before you you are unable to tell me what you would say her draft is there?

A. One can never tell from a photograph; one never knows the angle that a photograph is taken from; if it had been taken from the top down then there is no means of telling.

(Testimony of Wesley McLaren Hague.)

Q. You say from top down. I hold it out straight horizontally from your eye and ask you to tell me if you do not agree with me that was taken almost exactly in line?

A. I have sworn to tell the truth, the whole truth, and nothing but the truth, and one cannot tell from a photograph. You have seen photographs of races which show the second horse winning.

Q. I am not trying to prove that you are not telling the truth. I am only asking you for the best information you can give me. I have not thought for a minute that you were doing anything but telling me what the situation was. That is all I want. There is no personal relation involved in it at all. I am doing the best I can, and I certainly am not accusing you of doing any- [714] thing but giving us exactly what you believe to be the truth. Now, isn't it possible to come to a conclusion generally, within say five feet, knowing what you do about the size of the "Silver Palm," as to where her water line is on this picture in comparison with where it would have been at the time of the collision?

Miss PHILLIPS: Just a moment. I object to that on the ground the witness has been asked and answered it very positively twice, and there is no showing that the draft of the "Silver Palm" at the time that photograph was taken was the same as at the time of the collision. We can infer that it was not the same because the "Silver Palm," having

(Testimony of Wesley McLaren Hague.)

tremendous damage in her forepeak tank, we can infer certainly that any reasonable man would do something in saving a ship to change the trim.

Mr. LILLICK: My question assumed that she was of different draft at the time of the collision and that is what I asked the witness, and the witness tells me again he cannot answer the question.

Miss PHILLIPS: The witness has positively stated he could not answer that question.

Mr. LILLICK: Mr. Hague, I call your attention to the heavy black lines between the main and fore-castle deck marked on your diagram, will you tell me how high that came up in the hull of the "Chicago"?

A. That extends between the main and fore-castle deck of the "Chicago", between the uppermost deck and the deck next below.

Q. In other words, that came straight up to the top deck?

A. Yes.

Q. Can you tell me whether that was damaged?

A. Yes.

Q. What damage was there?

A. The vertical members were not damaged. The fore-castle deck has a covering over the upper handling room of approximately 80 pounds, 2 inches, special treatment steel; that covering extends over the side of the box some- [715] thing like that so that there is an overhang all around and that corner was bent down.

(Testimony of Wesley McLaren Hague.)

Q. I show you U. S. Exhibit No. 2-M and ask you whether you can tell me where the ammunition hoist is in that photograph?

A. No.

Q. I hand you U. S. Exhibit 2-F and ask you if you can tell me where the ammunition hoist is?

A. Yes.

Q. Will you on that picture indicate where the top of this member about which you have been testifying appears?

A. That runs straight up to the main deck. I am putting an arrow and marking "Vertical armor bulkhead upper handling room between main and forecandle deck."

Q. How far down does that extend? Will you draw a vertical line on the photograph?

A. It extends from the forecandle deck where I put one arrow to the main deck, and I will put a second arrow with an "X" in the line.

Q. So that this particular member was at the very top of the contact between the "Silver Palm" and the "Chicago"?

A. Excluding the turret gun mount and gun, yes.

Q. What is the distance between the top and the bottom of that vertically on the "Chicago"?

A. The distance between the top and bottom of that member, that upper handling room on the "Chicago" is 9 feet.

Q. Now, one more question with respect to that; the bottom of that 9 feet height was how far above

(Testimony of Wesley McLaren Hague.)

the water line of the "Chicago" as she was at the time of the collision?

A. The bottom of that 9 foot height was 20 feet above the water line of the "Chicago" at the time of the collision.

Q. I call your attention to Respondent's Exhibit No. 16, which on the stem is indicated her draft. Your estimate of the draft, again, of the "Silver Palm" at the time of the collision was what?

A. 23 feet. [716]

Q. 23 feet?

A. Yes.

Q. Will you on that diagram indicate where 23 feet would be?

A. I will indicate that 23 feet as approximately as a person can when the stem is turned over diagonally, so that 21, 22, and 23 does not indicate 23 feet exactly. 23 feet is approximately at the point where I have marked "Draft providing the draft marks of the 'Silver Palm'" are correct. In merchant vessels the draft mark could be out as much as 12 inches.

Q. Have you any idea that the draft marks on the "Silver Palm" were incorrect?

A. No.

Q. Now, with that as a basis for your computation of the 20 feet above the water line will you put on the photograph where you deem 20 feet above the water line to be?

A. I will guarantee none of this result.

(Testimony of Wesley McLaren Hague.)

Q. I am asking for your best opinion.

A. 20 feet above the water line.

Q. That is a distance, you said, as I understand you, that the bottom of the member we were discussing on the "Chicago" was?

A. Photograph measurements are not at all accurate. That may possibly be 20 feet above the water line.

Q. That is as well as you can do with respect to an estimate upon your part of where that would be?

A. On this particular photograph.

Q. And if it be approximately correct then there was nothing below this member, in your opinion, in the "Chicago" other than the parts indicated by your diagram that came in contact with the stem?

A. I do not understand the question.

Q. My understanding is that you have testified that the upper handling room extended for nine feet.

A. (Interrupting) Below the forecastle deck.

Q. Below the forecastle deck, and below that there was no reinforce- [717] ing armor plate: Is that right?

A. Yes, but below that we run into a very stiff system of transverse bulkheads.

Q. The bulkheads which you mean are the bulkheads involved in the various decks shown on the photograph?

(Testimony of Wesley McLaren Hague.)

A. No, I am referring to the bulkheads, the water-tight bulkhead No. 21, which I have described as being approximately as strong as the shell plating, and water-tight bulkhead No. 23 $\frac{1}{2}$ being stronger than the shell plating.

Q. Then tell me, if you will, what, in your opinion, caused the break of the stem on the "Silver Palm" shown in Respondent's Exhibit No. 16 that appears just above your approximate distance of 20 feet and from then on down to the foot of the stem?

A. I believe that that is the mark of the handling room, the lower handling room of the "Chicago."

Q. Then there is another handling room besides that one shown on your diagram?

A. We have been talking of two handling rooms, the lower handling room connected to an upper handling room by the ammunition hoist.

Q. So that your diagram does not show the lower handling room?

A. It is not labeled as the lower handling room, but it does show a very heavy line of the bulkhead forming the lower handling room.

Miss PHILLIPS: May I ask the witness to mark the line of that lower handling room he has been pointing to, as that does not get in the record.

A. I will use a wavy line to indicate by an "X" the lower handling room. The top of this lower handling room was just about three feet above

(Testimony of Wesley McLaren Hague.)

the water line at the moment of impact. That is why I believe that the lower part of the stem which is folded in and has been cut and broken from the upper part stopped sharp at this armored bulkhead which forms the lower handling room and the upper part extended on over to give the damage which is shown [718] on the second deck under the main deck.

Mr. LILLICK: Q. And the stem of the "Silver Palm," striking as indicated there, folded over toward the starboard side of the "Silver Palm" instead of to port?

A. Yes.

Q. What is your explanation of the line from frame 12 running as it does apparently diagonally across the stem and then the stop at the after end?

A. I believe that the "Silver Palm" coming in from an angle of about 40 degrees struck approximately here, where I have made this arrow, and I believe that the port anchor of the "Silver Palm" ripped this tear from frame 12 forward, and piling up wreckage before it, it got more and more into what we call a hard spot down here, and it had about that form if it came in from an angle.

Q. You will admit with me until the "Silver Palm" brought up on this bulkhead there was nothing in front of her to stop her other than what I have termed "gingerbread," and I mean the plating and the other non-armored material of the "Chicago"?

(Testimony of Wesley McLaren Hague.)

A. Yes, above, but not below. Below the water line we run into extremely strong structure on the "Chicago."

Q. Weren't we looking down on this picture and your last plate 7/16 inch?

A. That is pretty heavy plating compared with usual merchant construction, 7/16 is pretty heavy.

Q. Do you know what the plating was on the "Silver Palm"?

A. No.

Q. Do you know anything about the structure of the bow on the "Silver Palm"?

A. Not accurately, no.

Q. In your opinion, Mr. Hague, a vessel such as the one we have here of the "Silver Palm" was, as shown by these photographs, a very heavy bow with numerous reinforcing frames and members?

A. The bow of the vessel is always constructed very strongly.

Q. Isn't it your opinion when the "Silver Palm" was going at a rate of speed of 10 knots an hour, whether the "Chicago" was [719] moving or dead in the water, she would have gone through this plating until she landed at that point?

A. No.

Q. You do not?

A. No.

Q. How far in do you think she would have gone at 10 knots an hour?

(Testimony of Wesley McLaren Hague.)

A. Coming in at about 40 degrees?

Q. 40 degrees.

A. I would expect her to penetrate in this spot on the "Chicago" shown on the picture exactly as far as she penetrated.

Q. That is how many feet?

A. That is in the neighborhood of—it all depends upon what level we are talking about. If we are talking of the level of the second deck where the "Chicago" is soft then the penetration is considerably more, than if we are talking about below the first platform deck where the "Chicago" was anything but soft.

Q. I am talking about the "Chicago" just as she was, and not any other way.

A. Then the answer to your question is various penetration.

Q. Now, you say that she would have gone in just as she did on this occasion at a 40 degree angle. If she had come in exactly athwartships, straight from the beam at the point opposite frame No. 17, where you say you think she first came in contact, how much would she have penetrated the "Chicago," in your opinion, if she had been going at a rate of 10 knots an hour?

A. Up above the second deck she would have gone well beyond the center line, and probably 17 or 18 feet.

Q. What do you mean by well beyond the center line?

(Testimony of Wesley McLaren Hague.)

A. The center line of the "Chicago" and undoubtedly would have gone beyond it above. Down below the first platform deck it would not have penetrated so far.

Q. Mr. Hague, you don't know, do you, whether the "Chicago" was moving, or not?

A. No. [720]

Q. Would you say that from the gash in the side of the "Chicago" that you could definitely assert that the "Chicago" was not moving when the "Silver Palm" struck her?

A. No.

Q. Isn't it a fact that if the "Silver Palm" did come into the "Chicago" at a rate of speed of 10 or 11 knots an hour at an angle of 40 degrees that from the standpoint of a Naval architect and your knowledge of the "Chicago" there would have been approximately the same result if the "Chicago" was going 6 knots an hour?

A. 6 knots and the "Silver Palm" at 10 or 11?

Q. Yes.

A. No, I would expect the armature to have suffered considerably under those circumstances. That is a mere guess and bound to be a mere guess.

Q. There is no possible way of telling?

A. There is no possible way of estimating or calculating accurately.

Q. You, as a naval architect, of course, can lay out a plan and give us the thickness and weight

(Testimony of Wesley McLaren Hague.)

of certain portions of the "Chicago," but from the standpoint of a practical navigator and knowledge of what went on at that time had you been there, and had you know you would not say that your opinion with respect to this is anything which could be relied upon?

A. I do not understand you.

Q. Let us put it this way: This is a diagram made by you to indicate exactly what the result of this collision was in so far as the "Chicago's" structure was concerned?

A. Yes.

Q. And as a naval architect you could tell us that?

A. Yes.

Q. You have never been in a collision at sea, have you?

A. Yes.

Q. Where?

A. In Chesapeake Bay once.

Q. Between what ships?

A. That was between the Motorship "America Land" and a small sailing vessel, it does not amount to much.

Q. Was the "America Land" a steel vessel?

A. Yes.

Q. And the other a wooden vessel?

A. Yes. [721]

Q. So you have had no opportunity of judging what two steel vessels would do?

(Testimony of Wesley McLaren Hague.)

A. I have had the opportunity, of course, to see steel vessels after they came in from a collision.

Q. Yes, we all have. But I will ask another question, this diagram *is*, as I said before, represents what your opinion is with respect to what happened at the time of the impact and is based purely upon what you theoretically have worked out as to what might have happened if the "Chicago" was at rest and the "Silver Palm" came at 10 knots an hour: Is that it?

A. Yes.

MR. LILLICK: That is all.

Redirect Examination.

MISS PHILLIPS: I have another question I should have asked the witness on direct examination, and I will ask the privilege of asking it now, if I may.

Q. Mr. Hague, I am going to show you Government's Exhibit 2-F and I want you to show it to his Honor while I am asking this question. A witness testified yesterday, Mr. Dickie, for the Silver Line, that if the "Chicago" was standing still or almost still the accordion pleating on the after side of the cut in the "Chicago" could not have occurred but that the cut would have been clean on both sides. In your opinion is that testimony correct?

A. Absolutely no.

Q. Why not?

(Testimony of Wesley McLaren Hague.)

A. It could not be. In the lower part of this photograph we have a razor-like cut.

Q. On which side?

A. Both forward and aft. Above we have the accordion pleating. If that theory were sound then at the moment of actual contact and collision the upper deck of the "Chicago" must have been making considerable speed while the lower deck was still in the water, which, of course, is impossible and absurd.

Mr. LILLICK: Q. Would you agree with me that the lower por- [722] tion of this protograph, and I am pointing to the line from A to B, is a break of metal rather than a cut of metal? Isn't that just broken apart?

A. Metal always breaks in a collision, yes.

Q. But isn't that evidence of breaking apart?

A. Yes.

Miss PHILLIPS: I have one more question.

Q. You have said that the lines of cleavage shown in that drawing could have been caused if the "Chicago" had been at rest or going ahead. Will you explain the relation of the angle of impact to the angle of the axes of the two vessels so that we can have it better understood?

A. The matter of relative speed in damage of whatever nature is a function of relative speed masses, form of the objects in collisions and the structures of objects in collisions. Now, if I have got the "Silver Palm" off here on a course due east

(Testimony of Wesley McLaren Hague.)

and I had the "Chicago" here on a course due north, both traveling at 6 knots, as far as a man standing on the deck of the "Chicago" was concerned it would appear that the "Silver Palm" was side-slipping through the water at an angle of 45 degrees and the angle of impact would be 45 degrees, although the angle between the axes of the ships is 90 degrees.

Miss PHILLIPS: That is all.

Mr. LILLICK: That is all.

The COURT: We will take a recess now until tomorrow morning at ten o'clock.

(An adjournment was here taken until tomorrow, Thursday, March 29, 1934, at ten o'clock a. m.)

Filed June 19, 1934. [723]

Thursday, March 29, 1934.

BALDWIN M. WOODS,

Recalled for the United States in rebuttal.

Miss PHILLIPS: The witness has already been sworn, your Honor.

Q. Professor Woods, I am going to show you two photographs of the cut in the "Chicago's" side, Government's Exhibit 2-C and Government's Exhibit 2-E. Please put them on the table so that his Honor can see the pictures.

(Testimony of Baldwin M. Woods.)

Mr. LILLICK: May I see them?

Miss PHILLIPS: Yes. A witness testified day before yesterday for the Silver Line, Ltd. that if the "Chicago" had been standing still or almost still the corrugated pleating on the after side of the cut in these protographs could not have occurred, but that the cut would have been clean on both sides. In your opinion is that testimony correct?

A. No.

Q. Why not—and I am going to ask you to speak up, because in addition to the noise of the street we have the noise from a cleaning establishment.

A. It is necessary in analyzing the form of failure, I shall call it failure, when steel plates or other structures are ruptured, to take account of the strength of the structure and of its complexity. The folding on the right hand side could have been accomplished with the "Chicago" at rest in the following way. I think perhaps I had better make a diagram; I have a sketch here of my concept of what might happen in such a case. Let this represent the "Silver Palm," and let this represent the "Chicago" in very rough outline.

The COURT: So that the record will have it, let the line marked "S" represent the "Silver Palm."

A. The line "S" represents the "Silver Palm." [724]

(Testimony of Baldwin M. Woods.)

Q. That is the center line?

A. The main axis—the mark “C” refers to the axis of the “Chicago.” The two are shown at an angle of approximately 40 degrees between the axes. I assume that the “Silver Palm” might have any speed, and the “Chicago” might be at rest; I assume also by these little arrows four phases during failure. The first phase is one of contact.

The COURT: Marked “1”?

A. Marked “1”. At this phase the forward portion of this plating is thrown in greater tension than this portion, although with the deflection which takes place both sides will probably be in tension. There is also a tendency to slide, that is to say this portion might very well slide, tend to slide somewhat. It will be resisted, of course, by the inertia of the vessel and the pressure of the water on the wetted surface, which is a very great pressure. Failure will take place. During that failure it would be possible for the prow to be bent to starboard. After failure of this plate, which will be referred to as side plate of the vessel, suppose it would then strike a cross bulkhead, and I shall name that the first bulkhead—in that position we encounter the bulkhead. Now, I assume that in reaching position 2 there has been a certain deflection to the starboard of the bow, due to the resistance of the plates of the ship along—

Q. (Interrupting) Along the angle of impact?

A. Along the angle of impact. On encountering

(Testimony of Baldwin M. Woods.)

the first bulkhead, should it be of a certain strength, either greater or less than the outside plating, there will be a tendency if the deflection has not been so far as to turn it—if it has not been turned too far so as to fold it over, if the deflection is as shown—

Q. That would be a matter of degree of resistance?

A. That would be a matter of degree of resistance of the shell plating and of the strength of it. I am explaining the possibility of a cer- [725] tain statement. On striking this bulkhead, if it is of reasonable strength—strike out the word “reasonable”—if it exists the prow may be deflected to the port, and in sliding along it, it is clear that there will be a tendency in the force when it presses against there in the direction of the plate it will twist it. If this bulkhead should be carried away, the energy required to demolish will be reflected in the damage done to the prow, which may, under those conditions, and under those conditions would, turn it to port. Whether it will turn it beyond a straight position to it or beyond it I don't know, I think it would be impossible to tell without seeing the material, itself. On striking the second bulkhead, there being a considerable mass of debris accumulated by the demolition of the first bulkhead, there would still further be a turning to port. If the sum of the strength of the two bulkheads should prove materially greater than the strength of the side plating, the prow could be deflected considerably

(Testimony of Baldwin M. Woods.)

to port. That is a line of possible events, and such a treatment would cause, such a sequence would in the beginning tear the outer plating first on the forward side, because that side is in greater tension with this and the plates would be folded around and as compressed in here they could easily assume the convolutions that exist in the picture to me.

The COURT: What is that, a Government exhibit?

Miss PHILLIPS: That is Government's Exhibit 2-E. I showed Professor Woods two photographs and your Honor will recall my question was directed to the testimony that such convolutions could not have occurred if the "Chicago" were standing still, and Professor Woods is explaining his reasons why he did not think this testimony was correct.

A. I have a little example here. To continue, the question of what might happen in failure— [726]

Mr. LILLICK: I beg your pardon, what are you proposing to do with the candle and the wooden box?

A. With the candle and wooden box I wish to simulate what could happen with a substance that might be deflected and represent its deflection.

Mr. LILLICK: I object to such an analysis. I object to what apparently is a proposal to put a candle opposite a pasteboard box in what apparently is an attempt upon Professor Woods to show what might have happened with respect to the steel hull of one vessel being punctured by a steel

(Testimony of Baldwin M. Woods.)

bow of another vessel. I insist that the comparison is so absurd that it will neither help the Court to come to a conclusion with respect to the issues, but such a comparison is too remote and does not warrant its being done.

Miss PHILLIPS: I do not think the witness intended to show comparison between steel ships, but intended to illustrate what is meant by failures of material. If the Court does not feel that should be illustrated we will let it go.

The COURT: I think I can visualize what he says. What he is trying to show is the direction the force has penetrated.

A. Yes. As a matter of fact what I have in mind is shown on this sketch, your Honor.

Miss PHILLIPS: I would like to offer that sketch in evidence as Government's Exhibit next in order.

The COURT: It will be received as U. S. Exhibit 22.

(The sketch was marked "U. S. Exhibit 22.")

Miss PHILLIPS: Q. Professor Woods, can it be known in advance of an impact the direction in which the bow of the colliding vessel will bend, regardless of the condition encountered in the ship that is struck?

Mr. LILLICK: I object to the question upon the ground that it is immaterial, irrelevant, and incompetent; we are not con- [727] cerned with any issue involving what someone might think before

(Testimony of Baldwin M. Woods.)

the impact occurred. We have no testimony of any character with respect to that in this case.

Miss PHILLIPS: I beg your pardon. My questioning of the Witness Dickie very specifically was upon a very general question, and he stated a universal rule. I repeated the question to him that I was asking him a universal rule, whether or not it could be known that with a vessel moving or stationary, another vessel moving and striking it, whether we could know the invariable reaction of two metals. If you will refer to the transcript you will find it.

Mr. LILLICK: My objection to Miss Phillips' question as it is propounded is, could it be known in advance.

The COURT: The witness has not covered the same field. I think if the question that was propounded to Mr. Dickie was given the witness might be asked if that answer conforms to the truth in regard to the question.

Miss PHILLIPS: That is a very much better suggestion than mine. I will read this—

Mr. LILLICK: What page are you referring to?

Miss PHILLIPS: This is on page 565, and refers to Exhibit No. 18. I will place the pencil sketch before the witness. This was particularly referring to the blackboard sketch of which the pencil sketch is a copy. This is at the bottom of page 565:

(Testimony of Baldwin M. Woods.)

“Q. Now, Mr. Dickie, if a breakable structure comes at a hard structure, say at an angle of 35 degrees, or 45 degrees, or whatever degrees you want, do you say that invariably this structure is going to bend inward, if this structure is moving?

“A. If the horizontal line is moving it will tend to push the diagonal line over in the direction in which the horizontal line is moving. [728]

“Q. Mr. Dickie, assuming you have a straight line A-B, and we have a structure C-D striking at an angle, you say that the straight line A-B, if it is moving, the structure C-D is going to bend inward in the direction of the line A-B: Is that correct?

“A. Yes, that is correct.

“Q. Do you say that is going to be invariable?

A. Yes.

Q. And in this structure the bend is going to come like this and the bulge is going to come on the side next to the structure A-B: You say that is invariably correct?

A. Yes, that is correct.

“Q. Whereas if the structure A'-B' is stationary and the structure D-C hits it, you say that the structure D-C is going to bend?

“A. If the structure D-C is a ship it will penetrate into the structure A'-B', and will push the material in in the form of a V.

“Q. You have not answered my question. I am asking you as to the bending of this structure C-D,

(Testimony of Baldwin M. Woods.)

how that is going to bend. Is that going to bend inward or in the direction toward the structure?

A. If the structure A'-B' is at rest and the structure D-C strikes A'-B', the structure D-C will penetrate the structure A'-B'. The results more or less are a little bit confusing, because the structure of the "Silver Palm" at the bow is built up solid with heavy brackets and decks spaced about at the most six feet apart. It is very strong.

"Q. I am asking you a general question on stresses and strains, and I am asking you whether or not it could ever be said to be an invariable rule as to breaking inward in the first diagram A-B. Let us go over it again. Here is a structure A-B and it is in motion; we will assume the structure D-C hits it; you would say that the structure D-C is going to bend in that direction that A-B is moving ahead?

A. Yes, that is correct.

"Q. And that the bulge is going to occur on the side toward the structure A-B?

A. Yes. [729]

"Q. You say that is invariable?

A. Yes, that is invariable." Professor Woods, in your opinion is that testimony correct?

A. Referring specifically to the last question, it is not.

Q. Why not?

A. It would depend on the nature of the forces encountered during the failure.

The COURT: Q. During what?

A. During the failure.

(Testimony of Baldwin M. Woods.)

Q. What do you mean by "failure"?

A. By "failure" I mean the progress of penetration.

Miss PHILLIPS: Q. What conditions will affect it?

A. The interior condition of the ship struck or of the structure encountered, no matter what it is, and the characteristics of the structure it strikes. It was this particular point which I wished to simulate with the candle and paste board box, using the candle to represent—

Mr. LILLICK: I beg your pardon.

Miss PHILLIPS: Never mind that. It is going to depend on the conditions it strikes?

A. Yes.

Q. Could the "Silver Palm's" bow be turned to the port if the "Chicago" were going astern, the "Silver Palm" penetrating or striking the "Chicago" at an impact of 40 or 50 degrees?

A. Yes, if she is not going astern too fast.

Q. Can you illustrate that by a diagram, or can you explain it?

A. Yes. May I refer to the diagram I had a moment ago? When the structure represented by "S" strikes the structure represented by "C" at an angle between the axes of the two of about 40 degrees, the sequence of events represented by the arrow positions 1, 2, 3, and 4, it is entirely feasible as long as there is a component of motion in the

(Testimony of Baldwin M. Woods.)

direction of the axis of "C". Let me change that, as long as the resultant of the components of motion in the direction of axis "C" is toward the stern of "C". That is a mathematical statement that I shall elucidate now. [730] the velocity of any object having motion along a curve, and for simplicity let us assume the motion of "S" to be along a straight line, may be broken into two components at right angles, as one knows in elementary physics. Let the structure C be at rest. The velocity of S will have a component parallel to the axis of C, which, for convenience, I place out here and label V, meaning velocity V_1 . It will also have a component at right angles to the axis of C, in other words athwartships, which I shall designate as V_2 . If the structure C is moving astern with a velocity V_c , which is less than the V_1 , there will be left a velocity in this direction to exert pressure.

Q. You say "in this direction."

A. In the direction V_c .

Q. In a direction aft?

A. In a direction aft, there will be left a velocity in the direction aft to produce the type of deflections shown by arrows 3 and 4; that is to say, so long as the component V_1 in the direction of the axis of the "Chicago" is greater than the reversing component V_c , and parallel with it, there is a velocity left to cause pressure against the bulkheads indicated in the sketch.

(Testimony of Baldwin M. Woods.)

Q. Professor Woods, I show you Respondent's, Silver Palm's Exhibit No. 16. I wish you would examine that photograph. Do you see any evidence in that photograph of diverse structures encountered within the hold of the "Chicago"?

A. Yes, there is evidence of complex structures.

Q. Will you point them out?

A. There is evidence of some structure impinged against at this point.

Q. What point do you mean?

A. In this vertical hollow leading from about 20 feet above the water line down to—what does this 23 feet refer to from here to here?

Q. Those marks were put on by a previous witness; he has marked one point possibly 20 feet above water line and the other point [731] approximately 23 feet. I don't remember the transcript, but I think that 23 feet means above the keel. However, will you relate your suggestion about a hollow in relation to the two marks given on the picture opposite 20 feet and 23 feet?

A. The hollow reaches from above the mark possibly 20 feet above the water line to below the water line approximately 23 feet.

Q. Will you examine the fold in the hull of the "Silver Palm" below the mark approximately 23 feet? In your judgment which way does the stem of the "Silver Palm" appear to be folded?

Mr. LILLICK: I object to that on the ground that the witness is being asked a question which

(Testimony of Baldwin M. Woods.)

we, ourselves, can answer. We do not need the opinion of a witness from the standpoint of an expert on a matter that is self-evident.

Miss PHILLIPS: You mean it is self-evident that the "Silver Palm's" bow from the point marked in the photograph "Approximately 23 feet," the point below that, that it is self-evident that it is turned to starboard?

Mr. LILLICK: I will admit that it is self-evident that it was first turned to port and then later to starboard.

Miss PHILLIPS: I think you are now diagnosing the picture according to your opinion. I am going to ask the witness if he will diagnose it according to his opinion.

Mr. LILLICK: My objection he has not seen the vessel, itself, he is shown a photograph, he is not familiar with ship construction and his opinion is worthless, and I submit that the question is immaterial, irrelevant, and incompetent.

Miss PHILLIPS: I submit, your Honor, that the opinion of this witness is not worthless, and that the testimony of Mr. Dickie, covering the greatest part of this is theoretical knowledge of metals and bending of metals and the like, and this witness is certainly qualified to give an opinion on that. [732]

Mr. LILLICK: The witness is not shown to be anything but an expert upon mathematical computations with respect to bodies meeting each other.

Miss PHILLIPS: I do not propose to argue the

(Testimony of Baldwin M. Woods.)

question of the qualifications of the witness at this point. I am asking the Court if the witness is not qualified to express an opinion upon the force of the "Silver Palm's" bow and the force meeting that bow as indicated in that photograph. Will you read back the last paragraph in which I intended to convey what my question would be? (The record was here read by the reporter.)

Q. (Continuing) Professor Woods, I would like to have your opinion, if you can give it, upon the force meeting the bow of the "Silver Palm" at the point marked "23 feet downward" as indicated in that photograph.

Mr. LILLICK: I object to that question on the ground that it is indefinite, in that it calls for the opinion of the witness with respect to forces that, from the form of the question, would mean an answer that would be immaterial, irrelevant, and incompetent.

The COURT: Let me ask this question: You have previously expressed a theory regarding the force of impact on a moving object.

A. Yes.

Q. Do you think that your theory is borne out by the appearance as indicated by that picture, as to the effect of those forces?

A. I think that they are.

Q. Do you feel that you can tell that by looking at that photograph? Do you feel that you could depict that situation on that photograph relative to that question, or don't you?

(Testimony of Baldwin M. Woods.)

A. I think I can, to a certain degree. I would say this, that I believe that no one can tell——

Mr. LILLICK: Pardon me, I do not want——

[733]

Miss PHILLIPS: Just a minute——

Mr. LILLICK: He is answering a question from the court in a manner that denies me the right that I have to object to testimony, which had the witness answered the Court's question would have resulted in a "Yes" or "No," and at once the subject would have been closed, because this witness could only give what happens to these two vessels, because he knows nothing about vessel construction, he knows nothing about what would happen to these vessels in a collision of this character. He can look at the photograph, as he has looked at it, and his opinion is worth no more than any one of the witnesses in the court-room.

Miss PHILLIPS: I think counsel persistently overlooks the qualifications that the witness had, which were given on the first day. In answer to the Court's question the witness said yes, to a certain extent.

The COURT: He has said that he feels that he can point out such a formation there as might happen in an accident of this kind. That is correct?

A. Yes.

Miss PHILLIPS: Q. Will you point out what appears from the photograph No. 16, just indicate that?

(Testimony of Baldwin M. Woods.)

A. I use the word failure relative to the deformed or torn portion of the steel, which is a technical term often used when a structure is seriously damaged. The failure in a case of this sort will probably, and in nearly every case it is, preceded by stages, is impossible of complete analyzing from any single picture, because what happens in the later stages is compounded upon what has happened before. What happens in the failure is due to the summation of all of the events in the impact, the comparing of surfaces, the comparing of structures. It is clear from the photograph that a portion of the bow below the line approximately 23 feet had been folded to the starboard. It is also clear for some reason the portion of the bow just below the line marked "Approximately 23 [734] feet" was retarded and did not proceed in its demolition as far as the portion just above. The natural conclusion is that it encountered sufficient additional resistance, or let me change that, that it encountered sufficient resistance to fold this back whereas the portion above did not encounter adequate resistance; the portion above the same line did not encounter sufficient resistance to force it back, or else there was a difference in the strength of the portions above and below the line approximately 23 feet.

Q. Professor Woods, I have a question to ask you in regard to the ship model tests which you performed. I think you said that in your ship model tests the models you used were of certain dimensions. Do you recall now what they were?

(Testimony of Baldwin M. Woods.)

A. The model for the "Chicago" was approximately 49 inches long, and that for the "Silver Palm" approximately 40 inches.

Q. Is the ratio of 1 to 150 precisely according to the actual length of the two vessels?

Mr. LILLICK: I object to that as leading, your Honor, and suggestive.

The COURT: I think if the examination is going to continue much longer, we are running over the hour now, we will take a recess until two o'clock.

(A recess was here taken until two o'clock p. m.)

[735]

Afternoon Session.

BALDWIN M. WOODS

Direct Examination (resumed)

Miss PHILLIPS: Your Honor, I have decided to withdraw the question that I asked just before the noon recess. I think it has been covered by the testimony given the other day. There is one more question I would like to ask Professor Woods about the model tests.

Q. Was the beam of the model in the same proportion to the length as the beam of the prototypes to their lengths?

A. No, it was not the same.

Q. Does this affect the result obtained in the model tests?

(Testimony of Baldwin M. Woods.)

A. For a test of impact of the type that was undertaken there is no effect.

Q. Why not?

A. Because the resistance to the forward motion of the ship is affected only slightly by a change in beam to draft ratio, and the major effect here was not one of resistance of the ship to longitudinal motion, that is to say, motion in the direction of the axis, but the motion of the ship against the water supporting all of the wetted surfaces.

Q. Professor Woods, what is analytical mechanics?

A. Analytical mechanics is a study of the laws of forces involved in bodies at rest and in motion.

Q. Have you ever made a study of analytical mechanics?

A. For many years; I teach them, too.

Q. Are there laws of analytical mechanics which govern the design of frame structures?

A. Yes.

Q. Will you state whether the laws of analytical mechanics are or are not generally applicable?

A. They are generally applicable to structures.

[736]

Q. Under the term "frame structures" are you or are you not including ships?

A. Yes, I do.

Q. Have you made any study of marine engineering or naval architecture?

A. I have studied the principles of marine engineering.

(Testimony of Baldwin M. Woods.)

Q. Have you given courses in it?

A. No. The course given in them are under my direction. I must qualify the "No," however, as I offer at the present time a course in vibration in machinery, with special reference to vibration of ship machinery, for naval officers, at the University.

Miss PHILLIPS: You may, cross-examine.

Cross Examination

Mr. LILLICK: Q. Professor Woods, I am not sure, but I think in your direct examination the other day you mentioned the name of Rear Admiral Taylor.

A. Yes.

Q. The Rear Admiral Taylor whom you mentioned is the gentleman who wrote the book, "Speed and Power of Ships"?

A. Yes.

Q. Have you used that book in courses that you have given at the University?

A. No, I have consulted it as a reference.

Q. Did you consult it as a reference before you performed the tests with these models?

A. No.

Q. Am I right in saying—

A. (Interrupting) If the Court please, I should not like to have a false impression. I believe that my assistant consulted it before the test was made.

Q. I am speaking only of your testimony, Professor Woods. Can you tell me in what proportion as to linear dimensions speed of similar ships are worked out?

(Testimony of Baldwin M. Woods.)

Miss PHILLIPS: Just a moment. If I understand counsel, you are going to go back over the cross-examination of last week.

Mr. LILLICK: No, in the examination this morning the witness was asked as to the proportions that he used for the models.

Miss PHILLIPS: Which I withdrew because he had already cover- [737] ed it fully, and I withdrew the question at the opening of the session. I went into that and found that that data was fully covered.

Mr. LILLICK: I think even with that latitude should be given me on cross-examination of the witness with respect to his testimony that he gave this morning in connection with the diagram drawn and submitted to your Honor with respect to the effect of one vessel striking another, as evidenced by the diagram, itself.

Miss PHILLIPS: I would not object to counsel cross-examining the witness on what he testified to this morning, but from the way he began I thought he was going to go over the ship model tests which he spent almost a day on last week. I object to counsel now continuing the cross-examination upon the model tests as not proper recross-examination.

Mr. LILLICK: If your Honor please, this witness has been brought back to testify again, and has testified as to the forces and resistance, and I cer-

(Testimony of Baldwin M. Woods.)

tainly have a right to cross-examine on that subject.

Miss PHILLIPS: Counsel spent a day on it last week and finished cross-examining him on that subject.

The COURT: I do not understand this is on the ship model tests.

Mr. LILLICK: This is on the general subject of the witness' opinion of the effect of a striking effect upon another vessel in connection with the diagram.

Miss PHILLIPS: I have no objection to counsel asking a question on that. I misunderstood his question. I thought he was dealing with ship model tests, and my objection is withdrawn.

The COURT: If there is no issue on it you may as well proceed.

Miss PHILLIPS: I understand that counsel is not cross-examining the witness on ship model tests, he is going to question him [738] on the subject covered in chief in this morning's examination.

Mr. LILLICK: I will ask Miss Phillips to object to those questions which she feels to be objectionable as I ask the question. May I have the last question repeated?

The COURT: Read the last question.

(Last question repeated by the reporter.)

A. That is considering one a model of the other?

Miss PHILLIPS: Are you relating that now to ship model tests?

(Testimony of Baldwin M. Woods.)

Mr. LILLICK: I am relating it to the diagram which was offered in evidence this morning, which is on the Court's desk.

Miss PHILLIPS: Relating the question to Exhibit 22, which is now lying on the desk of his Honor?

Mr. LILLICK: Yes.

The COURT: You are now being questioned from Exhibit 22.

A. I fear I could not answer it.

Mr. LILLICK: Q. Can you answer whether in computing the displacement of similar ships there is a ratio?

Miss PHILLIPS: I object to this question as not proper cross-examination, if your Honor please.

The COURT: I cannot understand the question but perhaps the witness does. What are you referring to?

Mr. LILLICK: Only a few moments ago the witness was asked as to the breadth of the two models.

The COURT: I presume you have a right to cover that.

Miss PHILLIPS: May I have the question read?

The COURT: Read the question.

(Last question repeated by the reporter.)

Miss PHILLIPS: My question related to the ratio of the beam of the models to the length, in proportion to the ratio of the beam of the prototype.

(Testimony of Baldwin M. Woods.)

The COURT: I understand that, but that is not what Mr. [739] Lillick is inquiring about.

Mr. LILLICK: May I have the question re-read?

The COURT: Read the question.

(Question repeated by the reporter.)

Miss PHILLIPS: That is objected to as indefinite.

Mr. LILLICK: It is as definite and specific as I can make it.

The COURT: Do you understand the question as propounded?

A. I should have to interpret it in terms of model testing. The question is not complete as it is asked.

The COURT: Will you reframe it?

Mr. LILLICK: Q. What is it you do not understand about it?

A. Ratio between displacement might be a ratio between displacement of any two vessels.

Q. We are speaking of the "Chicago" and the "Silver Palm," and the models that you used to work out a similitude between them.

Miss PHILLIPS: Now, then, I object to that as not proper cross-examination, he is going back to a cross-examination of the model tests. I asked him only as to the ratio of the beam to the length of the prototype. Now he is going back and questioning him on displacement.

Mr. LILLICK: May I be heard.

The COURT: Proceed.

Mr. LILLICK: The validity of the tests made by Professor Woods with these models had to be

(Testimony of Baldwin M. Woods.)

worked out on the basis of displacement in reference to the breadth of beam, and it is that particular point that I am now attempting to cover.

The COURT: Answer the question.

Miss PHILLIPS: May I have the question read again?

The COURT: Read the question.

(The question was read by the reporter.)

Miss PHILLIPS: Objected to as unintelligible, indefinite, [740] vague.

Mr. LILLICK: I will re-phrase the question.

Q. Professor Woods, in computing the corresponding displacements of similar ships, in what proportion do you compute that in relation to their linear dimensions? You can tell me?

A. In computing the displacement of ships the displacement is, roughly, proportionate to the cube of the linear dimensions.

Q. In computing them in that manner what relationship do the wetted surfaces and the immersed amidship areas have?

A. That would depend upon the beam, upon the ratio of the beam as to draft, and upon the curve of the ship lines.

Q. In the models that you used in the tests, what comparison did you have between the displacement of the wetted surface immersed at the beam on the model "Golden Boats" which was taken for the "Silver Palm"?

A. The mode of obtaining similar displacements—

(Testimony of Baldwin M. Woods.)

Q. (Interrupting) I beg your pardon, I do not want to interrupt you, but if you will answer the question, and then if you wish to explain explain it afterward. Might I have the question reread to the professor?

The COURT: Read the question.

(Last question repeated by the reporter.)

A. For the displacement I had ratios comparable to those of the prototypes by the simple expedient of having the weight of the two vessels, in the ratio of the weight of the prototype, and by having the lengths approximately.

Mr. LILLICK: Q. Do you know anything about the wetted surface of the "Silver Palm"?

A. I did not know the value of the wetted surface of the "Silver Palm," no.

Q. Did you know anything about how far the "Silver Palm" was immersed at the amidships area?

A. No.

Q. Did you know anything about the wetted surface of the "Chicago"? [741]

A. No.

Q. Did you know anything about—

A. I mean to say as to the exact value.

Q. Professor Woods, you knew nothing about the wetted surface of the "Silver Palm" and the "Chicago" as it was when the two vessels came in contact?

A. One cannot escape knowing something about the wetted surface of a vessel if he knows its length and displacement and general form.

(Testimony of Baldwin M. Woods.)

Q. What was the wetted surface of the "Chicago" used in your tests?

A. In model tests one avoids the necessity of making such complicated computations by using models which simulate the original. It is not necessary in this test to have a close approximation to the wetted surface.

Mr. LILLICK: May I ask that the question be re-read to the witness?

The COURT: Read the question again.

(Last question repeated by the reporter.)

A. I used that which the model exhibited when immersed at the weight specified in the test.

Mr. LILLICK: Q. You have seen not only the model of the "Chicago" offered in evidence, which I hold up this way, but photographs, and it is your testimony that the model which you used to work out the similitude between them has a wetted surface comparable to that of the "Chicago"?

A. For the purpose of this test, yes.

Q. The test was a very complicated one, was it not, Professor?

A. The test was a simple one on a complicated problem.

Q. On a complicated problem?

A. On a complicated problem.

Q. And with a complicated problem accuracy of figures, if a valid result is to be obtained must be your premise, isn't that true?

A. No; in a geometrical plan, for accuracy, the dynamical [742] elements simulated is the important thing.

(Testimony of Baldwin M. Woods.)

Q. Professor, I would like to read this to you and ask you whether you agree with it, from your knowledge of dynamics and the tests that you have made. "Rear Admiral D. W. Taylor, U. S. N., in his *Speed and Power of Ships*, the book which contains the well-known and widely-used curves of residuary resistance per ton of displacement.

"The corresponding speeds for similar ships are speeds proportional to the square roots of their linear dimensions.

"The corresponding displacements of similar ships are displacements proportional to the cubes of their linear dimensions.

"The corresponding residuary resistances for similar ships at similar speeds are resistances proportional to the cubes of their linear dimensions.

"The corresponding horsepowers required to overcome the residuary resistance for similar ships at similar speeds are powers proportional to the 3.5 powers of their linear dimensions.

"The corresponding wetted surfaces and immersed amidship areas of similar ships are proportional to the squares of their linear dimensions."

Do you agree with that statement of the premise upon which tests of this character must be made?

A. Not tests of this character.

Miss PHILLIPS: Counsel has asked two questions in one.

Mr. LILLICK: I will separate it.

Miss PHILLIPS: First, does he agree as to those things, that is one thing.

(Testimony of Baldwin M. Woods.)

Mr. LILLICK: Do you agree with that?

The COURT: He has answered both by saying that as far as tests of this character are concerned that he does not agree. Is that correct?

A. I agree with that for tests for the purpose for which that section is written. I should like to call attention [743] to the fact that residuary horsepower is a fraction of the horsepower engendered.

Mr. LILLICK: Q. What effect, in your opinion, would a horsepower of 18,000 on the "Chicago" actually applied at the moment of impact and a horsepower of 7500 upon the part of the "Silver Palm," at the moment of impact, have?

A. May I have that question read again?

The COURT: Read the question.

(The question was read by the reporter.)

A. I cannot answer, I do not understand. What kind of effect?

Mr. LILLICK: Q. As to a comparison between them or respectively upon each of the vessels, themselves, and an experiment or test performed by you where there was no horsepower.

The COURT: Do you mean as applied to this case toward driving a ship forward?

Mr. LILLICK: Yes.

A. A power of 18,000 on the "Chicago," U.S.S. "Chicago" would probably be sufficient to drive it at a constant speed at a rate of about 16 knots. I am not able to estimate more than roughly what the horsepower for the "Silver Palm" would do, since I

(Testimony of Baldwin M. Woods.)

had understood that 5500 was the horsepower applied to her for a speed of 13 knots.

Q. In your opinion, would the application of the horsepower I have mentioned to those respective vessels at the moment of impact have modified in any degree the tests made by you with models where no power was applied to the models?

A. The modification would have been too small to be measured.

Miss PHILLIPS: I am going to make the objection that counsel is going beyond all bounds of reasonable cross-examination. He spent a day on this last week cross-examining the witness upon the relationship of that and now he is going all over it. I absolutely object to this cross-examination, and I think, your [744] Honor, the record will bear me out.

Mr. LILLICK: May it please the Court, the last question propounded to the witness discloses that the witness is of the opinion that there would have been only a negligible difference with the application of this horsepower.

Miss PHILLIPS: I renew the objection.

Mr. LILLICK: I am satisfied to leave it at that.

Q. Professor Woods, I call your attention to the diagram offered in evidence this morning, U. S. Exhibit 22, and the pencil drawing at the bottom, the "S" upon which I understand represents the angle of approach of the "Silver Palm," and the "C" the axis of the "Chicago." In this diagram what distance did you mean to indicate between the

(Testimony of Baldwin M. Woods.)

numerals "1" and "2" at the respective points on the diagram?

A. I did not intend in the drawing to indicate any distance to scale, but to show what sequence of events might happen, with the approximate geometrical position of the side wall or plating of the "Chicago," and the two bulkheads shown.

Q. Without respect to the distance between the skin of the "Chicago" and the first bulkhead shown by "2"—you mean you intended no distances indicated?

A. No, I intended none.

Q. And between the figures "2" and "3" you intended no indication of distance?

A. None other than would be generally inferred from the diagram.

Q. And also no distance between the figures "3" and "4"?

A. With the same limitation given.

The COURT: Except as to these points, the first bulkhead and second bulkhead?

A. Yes.

Q. That is the only point where there might be?

A. Of course, I assumed by the geometry of the figures that is shown.

Mr. LILLICK: Q. What do you mean by the geometry of the figures that is shown?

A. In other words, that the point of [745] contact as given by the figure "1" should not be taken at the immediate junction, for example, of the side frame and the bulkhead, without considering the

(Testimony of Baldwin M. Woods.)

compound effect, for example, in this diagram; I took separately the effect of the side plates and the bulkhead.

Q. And the distance between "1" and "4" being the distance that you entered, the assumption that you made with respect to the diagram, you paid no attention to whether it was 30 feet or 10 feet?

Miss PHILLIPS: Your Honor, that has been asked and answered.

Mr. LILLICK: I beg your pardon.

Miss PHILLIPS: He has already testified this diagram did not represent distance, and he has been asked and answered that three times already.

Mr. LILLICK: I have a right to ask it six times.

Miss PHILLIPS: I think the rest of us have some rights on it, and I think the Court has some rights not to have counsel repeat questions unnecessarily.

Mr. LILLICK: I am not going to repeat them unnecessarily. As far as I know that is the first time I have asked that question. May I have it repeated?

The COURT: Read the question.

(Last question repeated by the reporter.)

A. The assumption being made is simply that in the penetration the position indication was reached.

(Testimony of Baldwin M. Woods.)

Mr. LILLICK: Q. Without any depth?

A. Well, they would not be reached if the depth is greater than the penetration.

Q. Then the point from 1 to 4 is intended by you to be designated on this diagram is the distance from the skin of the "Chicago" to the second bulkhead: Is that right?

A. Yes.

Q. And in drawing the diagram you assumed, I understand, that the "Silver Palm" penetrated the "Chicago" in a straight line: Is [746] that right?

A. For simplicity in this diagram I assumed that the main axis of the "Silver Palm" did not turn to any extent. However, had it turned that would not invalidate the reasoning concerning the several points of penetration.

Mr. LILLICK: Might I ask that the question be read again? The witness does not directly reply to my question. Might I have it repeated again?

The COURT: Read the question.

(Last question repeated by the reporter.)

A. No, that is not essential.

Q. I am not asking you that.

A. I am attempting to answer.

The COURT: He is not asking whether it is essential to that, but whether as a matter of fact in drawing the diagram you did not assume that.

A. I did not limit myself to that.

Mr. LILLICK: Q. I am looking at the diagram, I don't know what is in your mind, and I don't

(Testimony of Baldwin M. Woods.)

know what was in your mind when you drew the diagram. In looking at the diagram, it seems to me that you have indicated that the "Chicago's" axis was on one line and the "Silver Palm's" on another, and that you assumed for the purpose of the diagram that the "Silver Palm" had gone straight in. Did you or did you not?

A. I should say not. The reason that I hesitated in answering that is I was considering the total situation which I was trying to picture, and I was attempting to recall in each step what I had assumed concerning the axis of the "Silver Palm."

Q. In your testimony this morning, Professor Woods, you used the words, as I remember it, "In arguing for this position, I did this," etc. Did you intend this diagram as a picture for a set of facts that you were testifying to?

A. The answer is No. Your Honor, I do not recall that statement. Would I be permitted to hear it from the record, that I said that I argued [747] it? I will let it pass.

Q. Professor Woods, I show you Respondent's Exhibit No. 9, and I call your attention to the portion of the bow of the "Silver Palm" in this photograph taken after the vessel was put in dry dock, and call your attention to the lap in the stem which you testified this morning was pushed to starboard on the "Silver Palm." Would you or would you not say in looking at this photograph that the bow

(Testimony of Baldwin M. Woods.)
of the "Silver Palm" had been pushed bodily to port?

A. The major portion, the major part of the result is the turning to port as far as one can judge from this picture.

Q. So that, in truth and in fact, the testimony that you gave this morning that the stem of the "Silver Palm" was pushed to starboard had reference only to that portion of the fold of the stem that on this photograph is shown to be but a minor part of the bow: Is that a fair statement?

A. It is, yes.

Q. In the diagram which was offered in evidence as U. S. Exhibit 22 you did not take into consideration whether there was any difference in the resistance of the skin of the "Chicago" as compared with the strength of the bow of the "Silver Palm," did you?

A. I assumed that the bow of the "Silver Palm" was strong enough, even though it might fail in the progress, by which I mean be deformed, to continue through the side plates, through the first bulkhead and up against the second.

Q. And as it went through the first bulkhead and up to the second bulkhead it is your opinion that the stem of the "Silver Palm" kept intact?

A. No, I did not say that.

Q. Then I misunderstood you. When, in your opinion, did the stem of the "Silver Palm" commence to be deformed?

(Testimony of Baldwin M. Woods.)

A. Its deformation, as was the deformation of the "Chicago" was probably a continuous process, very difficult to analyze, continuous from the time of the impact to the time at which there was no relative motion of [748] the two vessels.

Q. I call your attention to U. S. Exhibit No. 2-C, and ask you what, in your opinion, caused the cutting of the port bow of the "Chicago" at the forward portion to which I am pointing?

A. That is a question of surmise. If I have to answer I should say it was probably the port anchor of the "Silver Palm."

Q. Is not the balance of your testimony surmise, because you don't know what happened?

A. It is a hypothetical situation, it is answering a hypothetical situation.

Q. It is answering a hypothetical situation based purely on theory, isn't that true?

A. Following an observed experiment.

Q. But as far as practical action on these two vessels is concerned, you know nothing about it?

A. I have seen neither one of them since the accident.

Q. Taking the stem of the "Silver Palm" shown on Respondent's Exhibit 14, and bearing in mind the overhang of the "Chicago," what portion of the stem of the "Silver Palm"—I am referring now to Respondent's Exhibit 14—was it that commenced to cut into the port side of the "Chicago"?

(Testimony of Baldwin M. Woods.)

Miss PHILLIPS: I believe, your Honor, this is not proper cross-examination. I did not question this witness upon the actual contact between the two vessels.

Mr. LILLICK: Miss Phillips, I am directing this testimony to an explanation of U. S. Exhibit 22, with the testimony that the witness has given with respect to the effect of penetration and what happened to the bow of the "Silver Palm."

Miss PHILLIPS: Your Honor will remember that my questions to this witness upon what might happen after penetration of the side of the "Chicago" were all directed to contradicting the testimony of the witness Dickie, yesterday, that invariable results were obtained. [749]

Mr. LILLICK: May it please your Honor, the only reason for the length of my cross-examination is to definitely and positively put in this record that this is all hypothetical from Professor Woods, and when checked with actually what happened, the two do not check. That is the only object of the cross-examination, and I submit I am entitled to have an answer to the last question.

Miss PHILLIPS: The witness has said it was hypothetical.

The COURT: In this particular instance; he formerly testified to what occurred of the injury at the angle where it was struck, the force which was struck, and what the sequence of events would be.

(Testimony of Baldwin M. Woods.)

You have not made any study of these two vessels where the penetration occurred?

A. No.

Q. In other words, what you have done is simply surmised from the penetration?

A. Yes.

Q. The two vessels you have not made a study of?

A. No.

Mr. LILLICK: We submit to your Honor's ruling on that.

Q. As I understand you now, Professor, with actual photographs before you of the resultant damage to the two vessels, you feel that, coupled with your theoretical knowledge, you are unable to answer questions propounded to you by me looking toward an explanation of the reason for the damage shown in the photograph: Is that right?

The COURT: I do not want to put the Professor in a hole. I think he has answered he never made a study of it, and consequently he is only expressing himself as far as the theoretical situation exists of the contact of the two ships, isn't that it?

A. Yes.

Q. In other words, you have not made a study of these photographs?

A. No.

Q. That is a feature he has not made a study of. Isn't that correct?

A. Yes, I have not studied the photographs, but I could [750] study them.

(Testimony of Baldwin M. Woods.)

Q. But you have not made that study?

A. No.

Mr. LILLICK: I feel like apologizing to the Court for pursuing this line of cross-examination a little further after the ruling of your Honor, but, nevertheless this morning the witness testified from the photograph calling attention to certain convolutions in the after part of the cut, and since his testimony was directed to that point this morning it is apparent that the witness was willing this morning to testify with respect to a theoretical hypothesis followed by what he read from the photograph. Now, I would like to have the witness reply only to one question with respect to the forward part of the photograph. Professor Woods, I show you United States Exhibit 2-C, and call your attention to the cut in the forward portion of the photograph and ask you whether you will give me your opinion as to whether that was caused by the stem of the "Silver Palm" or by a part of her bluff bow.

The COURT: Answer that if you feel you can answer that by viewing the photograph.

A. I should be unable to say.

Mr. LILLICK: Q. And yet you are willing to say that the convolutions in the after part of the cut were due to the sequence of pressures that occurred while the "Silver Palm" and the "Chicago" were coming together?

A. I think it could be due to that.

(Testimony of Baldwin M. Woods.)

Q. And yet, again, that is a surmise on your part?

A. No. That was the result of an analysis of the assumed events.

Q. And now is it based upon a hypothesis without knowing the facts?

A. Well, an analysis based upon—an analysis which was valid in so far as the hypothesis was valid, but without knowing the geometrical framework facts of this case. [751]

Q. And all of the forces going into the blow, what occurred with the engines and otherwise, that is true, you did not know that?

A. No, I did not know all of the forces going into it.

Q. This morning you gave us a statement as to the ratio of the length of the model; if the ratio of the length of the model to the prototype was 150 to 1 and a speed representing 12 knots was engendered on the model, would the kinetic energy thus created be comparable?

Miss PHILLIPS: I wish to point out that no such question was asked the witness. Counsel objected and I withdrew it. He is now going back to what was covered last week.

Mr. LILLICK: I withdraw my question if your question with respect to 150 to 1 was withdrawn.

Miss PHILLIPS: It was withdrawn a half hour ago. That was all covered in the examination of last week.

(Testimony of Baldwin M. Woods.)

Mr. LILLICK: I withdraw my question.

Q. As I understand you, Professor Woods, you have no means of knowing where the first contact between the two vessels came?

A. No.

Q. So that in the tests you simply computed the point of contact at a certain distance from the stem of the "Chicago"?

A. I was informed approximately where it had been.

Miss PHILLIPS: Now, your Honor, he is beginning to go over what he covered last week.

Mr. LILLICK: That is all.

Miss PHILLIPS: Your Honor, Professor Woods asked if he might be permitted to take the models back.

The COURT: I understood from Mr. Lillick there was no objection to their being taken back.

Mr. LILLICK: We have one more witness on surrebuttal, and as soon as he is finished they may be taken back. [752]

FRANK BARROWS FREYER,

Direct Examination (resumed).

Miss PHILLIPS: Your Honor will remember that in starting yesterday with Captain Freyer I qualified him and then there was a little mix-up in the exhibits. May I have the record straightened

(Testimony of Frank Barrows Freyer.)

out up to the last question I asked on the qualifications and then begin again?

Mr. LILLICK: May it please the Court, I have not gone over the record. If the testimony is in and the witness has made an error with respect to it, I think we are entitled to have the record show it.

Miss PHILLIPS: It was just that he was looking at the wrong plot.

Mr. LILLICK: Yet the testimony went in——

Miss PHILLIPS: Let us not talk about it, and let us go ahead. I am going to begin again with the first plot, and your Honor will see what it was. It will simply take a little more of the Court's time. By the way, have you the exhibits of Captain Cox.

Mr. LILLICK: Which ones do you want?

Miss PHILLIPS: I am asking counsel to produce the original sketches that Captain Cox made at the time his deposition was taken, in which he diagrammed the position of the "Chicago," the position of the "Silver Palm," the distances and angles and times. He made three such exhibits. They were not in court yesterday attached to the depositions, as I pointed out, and I went ahead with the photostatic copies. I am now asking for the original exhibits.

Mr. LILLICK: Those exhibits were brought out to the Court yesterday and given to the Clerk.

Mr. GEARY: Here they are.

The COURT: I believe I have the photostat copies. [753]

(Testimony of Frank Barrows Freyer.)

Miss PHILLIPS: Yes, these are the originals.

Q. Captain Freyer, are you familiar with these three sketches?

A. I am.

Q. Have you attempted to plot the positions of the two ships as shown on those three exhibits, Exhibits 1, 2, and 3, I think they are, in the deposition of Captain Cox?

A. I have made a plot of those on what is called a mooring and maneuvering board, setting forth an assumed speed for the "Silver Palm," angle at which the "Silver Palm" cited the "Chicago," and the angles and distances at which the "Silver Palm" sighted the "Chicago" and the angle of the collision as set forth in those three exhibits.

Q. Of Captain Cox's testimony?

A. Yes.

Q. Captain Freyer, will you take your first mooring board that shows position 1 of the "Silver Palm" and position 1 of the "Chicago" at the bottom of the exhibit indicated as a blur. You placed those what distance apart?

A. Those are placed at a distance of 2500 yards.

Q. And at what bearing?

A. With the "Chicago" bearing 16 degrees on the "Silver Palm's" starboard bow.

Q. In your position No. 2 the respective vessels are what distance apart?

A. I have placed the "Chicago" at 1800 yards and 26½ degrees on the "Silver Palm's" starboard bow?

(Testimony of Frank Barrows Freyer.)

Q. And what distance did you have the "Silver Palm" cover between her first and second position?

A. That is 326 yards, which represents the distance the "Silver Palm" would cover at an average speed of 13.03 knots for three-quarters of a minute.

Q. And the distance the "Chicago" covered between positions 1 and 2 was how much?

A. That is 500 yards, which for three-quarters of a minute would give an average speed of 20 knots.

Q. The distance between the "Silver Palm's" position 2 and the collision point is how far?

A. That is 491 yards, which was based [754] on an average speed of 11.78 knots for one and a quarter minutes.

Q. The "Silver Palm" covered from her first position to the collision point how many yards?

A. 817 yards.

Q. And in what space of time?

A. Two minutes.

Q. And that gave her an average speed over the ground of how much?

A. $12\frac{1}{4}$ knots.

Q. For the "Chicago" to go from position 2 to 3 required her to cover how many yards?

A. That distance is 1300 yards, which in one and a quarter minutes would give an average speed of 31.2 knots.

Q. If the "Chicago," on reaching from 1 to 2 had an average of 20 knots, then from position 2 to 3 had to have an average of 31 knots, to what

(Testimony of Frank Barrows Freyer.)

speed would the "Chicago" have to reach in order to cover the distance from position 2 to position 3 in one and a quarter minutes?

A. With the "Chicago" making 21 knots at position 2, an average speed of 31.2 knots between positions 2 and 3 would require a speed at position 3 of 41.4 knots.

Miss PHILLIPS: I will offer this plot in evidence as Government's Exhibit next in order.

The COURT: It will be received as U. S. Exhibit 23.

(The plot was marked "U. S. Exhibit 23.")

Miss PHILLIPS: I might state the purpose of these various charts is to show that Captain Cox testified as to mathematical impossibilities. That is my sole purpose in offering them.

Q. Now, did you make a second plot of the position of the two vessels?

A. I did. That was the one that was erroneously introduced yesterday; as I stated yesterday, there were four of these positions in which it was assumed there might have been an error in estimating the distance between the two ships by the "Silver Palm", so that to see what difference there might have been in estimating the distance, there were three other plots in which the distances were reduced from 2500 yards to 2000 yards, 1500 yards, and [755] 1000 yards; that is the distance between the No. 2 "Silver Palm" and "Chicago" were reduced from

(Testimony of Frank Barrows Freyer.)

1800 yards in the same proportion that 2000, 1500 and 1000 are in proportion to 2500 yards.

Q. That is, you, in the second, third, and fourth plots, as I take it, what you assumed was that Captain *Coxe*, as to the angles, might have been correct, but that he made a mistake as to the distance?

A. Yes.

Q. Upon what assumption or what reasoning did you base such an assumption?

A. It was based on there being a diversity in the estimates of distance as between the officers of the "Silver Palm" and those of the "Chicago."

Q. That is, a mistake as to distance was possible?

A. Yes.

Q. But as to the angle it was probably correct?

A. Yes. I might qualify that, that there seems to be a better chance of there being an error in the estimated distance than in the bearing.

Q. Now, let us take the second plot. In that plot you placed the two ships at what distance apart?

A. I might say that in this and in the next three exhibits, that is, for all four, the position of the "Silver Palm" is the same, because the assumptions are the same as to her speed, her course and speed. The only difference then would be a difference in the position of the "Chicago" and in the results.

Q. Now, in your second plot, position 1 of the "Chicago," which appears as a big blotch in the

(Testimony of Frank Barrows Freyer.)

fog, and position No. 1 of the "Silver Palm," the distance is how far?

A. That is 2000 yards, and the distance between No. 2 position of the "Silver Palm" and the "Chicago" reduced proportionately is 1440 yards.

Q. And the third position of the two vessels is the collision point?

A. Being the same as before.

Q. Now, how far would the "Chicago" have had to move from position 1 to 2?

A. That is 325 yards, which for three-quarters of [756] a minute would give an average speed of 13 knots.

Q. And the distance of the "Chicago" from 2 to 3 is how far?

A. 932 yards, which for one and a quarter minutes gives an average speed of 22.37 knots.

Q. What rate of speed would the "Chicago" have had to reach in order to make good this yardage between positions 2 and 3, that is, how far would she have had to go to get an average of 22 and a fraction knots?

A. That is 932 yards.

Q. Yes, but what speed would she have to make in order to cover that distance in a minute and a quarter, which would make an average of 22 and a fraction knots?

A. As I said, the average speed was 22.37 knots.

Q. All I want to know in order to get that clear is what speed would she have to reach for that time?

(Testimony of Frank Barrows Freyer.)

A. I started at position No. 1 placing the "Chicago" at a speed of 9 knots, and letting her work up to a speed of 17 knots at No. 2, which would give an average of 15 knots; then taking that speed at No. 2 of 17 knots, in order to average 22.37 knots would have required at position No. 3, the point of collision, that she was making 27.74 knots.

Q. What change in course would the "Chicago" have had to have made between positions 1 and 2—can you estimate that, Captain Freyer?

A. The course made good between those positions was 319 degrees, and I might add that it would require the "Chicago" to have had a tactical diameter of 420 yards to have gone from position 1 to position 2.

Miss PHILLIPS: I will offer that plot in evidence as our exhibit next in order.

The COURT: It will be received as U. S. Exhibit 19, having been formerly marked that number.

(The plot was marked "U. S. Exhibit 19.")

Miss PHILLIPS: Q. Now, the third plot, you assumed a distance [757] between the two vessels at the start of how many yards? Will you point that out to the Court? The third plot assumes an initial distance between the two vessels of how many yards?

A. At position 1 1500 yards, the distance at position 2 reduced proportionately would be 1080 yards, that is the proportion of 2500 as to 1500, and as 1800 is to 1080.

(Testimony of Frank Barrows Freyer.)

Miss PHILLIPS: Your Honor has not had an opportunity to read the depositions. Captain Cox's testimony, parenthetically, was the two vessels were sighted at 2500 yards two minutes before the collision; 45 seconds before at a distance of 1800 yards, and then a minute and a quarter later they were in collision. He testified as to the angles. Now, as to the three exhibits Captain Freyer is assuming that Captain Cox's estimates of angles are correct, but that he was erroneous in his distance. Each exhibit is based upon that theory.

Q. Now, Captain Freyer, taking your third plot, the distance which the "Chicago" had to make between position 1 and 2 is how far?

A. It is 160 yards, which for three-quarters of a minute gives an average speed of 6.4 knots.

Q. The distance from position 2 to 3 of the "Chicago" was how far?

A. 595 yards, which for one and a quarter minutes gives an average speed of 14.28 knots.

Q. The change in positions from 1 to 2 would have required what sort of a change in the "Chicago's" heading?

A. The course made good by the "Chicago" from 1 to 2 position was 309 degrees, and that would have required the "Chicago" in going from position 1 to position 2 to have a tactical diameter of 200 yards.

Q. Of 200 yards?

A. Yes.

(Testimony of Frank Barrows Freyer.)

Q. That is a tactical diameter of her own length?

A. Yes.

Miss PHILLIPS: I offer that in evidence as Government's Exhibit next in order. [758]

The COURT: It will be received as U. S. Exhibit 24 in evidence.

(The plot was marked "U. S. Exhibit 24.")

Miss PHILLIPS: The next one, will you explain that to the Court, the distance between the positions 1 and 2 of the "Chicago"?

A. As I stated before, the distance assumed between position 1 of the two ships was reduced from 2500 to 1000 yards, the distance between the 2 positions, being reduced proportionately, was 720 yards. The result is that the distance between the "Chicago" No. 1 and No. 2 positions is 55 yards, which for three-quarters of a minute gives an average speed of 2.2 knots. The distance between No. 2 and No. 3 positions is 275 yards, which for one and a quarter minutes gives an average speed of 11 knots.

Q. For the "Chicago" to move from position 1 to position No. 2, what motion in the water would she have had to make?

A. The course is 241 degrees, which would have been practically astern.

Q. What is that circle in the fog bank there on that fourth sketch,—what does that represent?

A. That represents a point 1000 yards from position 1 of the "Silver Palm."

(Testimony of Frank Barrows Freyer.)

Q. In going from position 1 to 2, would the "Chicago" have had to go backward, be moving astern?

A. If that were the bridge of the "Chicago."

Q. Would it require any lateral motion, side-wise motion, in order to make that, or could you tell?

A. That would depend on the heading of position No. 1.

Q. What tactical diameter would the "Chicago" have to have to make this last change of course indicated in your fourth plot, or can you state it?

A. There would have been no tactical diameter in such case, as I think, in my opinion, she would have had to maneuver in that position by use of rudder and propeller. [759]

Miss PHILLIPS: I will offer that as Government's Exhibit next in order.

The COURT: It will be received as U. S. Exhibit 25.

(The plot was marked "U. S. Exhibit 25.")

Miss PHILLIPS: Q. Captain Freyer, have you made another plot of the positions of the "Chicago" and the "Silver Palm"?

A. I have.

Q. Will you explain to the Court the premise or theory of this last plot?

A. This is a plot to show in general the position of the "Silver Palm" as related by the "Chicago," with the basis in time element of one and three-

(Testimony of Frank Barrows Freyer.)

quarter minutes between positions 1 and 2. In constructing this I first placed the vessels at the collision point, with the "Chicago" on course 350 degrees, and with the "Silver Palm" at an angle of 45 degrees to the "Chicago." I then moved the "Chicago" back 262 yards, which distance is represented by assuming that the speed at position 2 was zero and her speed at 1 was 9 knots, an average of speed of four and a half knots, which for one and three-quarters minutes gives 262 yards.

Q. If I understand you correctly, in the position of the "Chicago" in the lower part of the chart, you have the "Chicago" on what course?

A. At that time her course was at 330.

Q. And she is going at nine knots?

A. Yes.

Q. Then for one and three-quarters minutes you have her moving forward at an average speed of four and a half knots?

A. That is right, and then a change of course to 350.

Q. That is premised then on what principle, when you say the "Chicago's" speed dropped from nine knots to an average speed of four and a half knots in two minutes?

A. One and three-quarter minutes.

Q. Thank you, one and three-quarters minutes.

A. You mean how [760] did I determine the 260 yards?

Q. Yes.

(Testimony of Frank Barrows Freyer.)

A. That was obtained by multiplying $4\frac{1}{2}$ by 100, or 450, which is the number of yards made in three minutes, and dividing that by 3 for the number of yards in one minute, and by multiplying by one and three-quarters for the number of yards in one and three-quarter minutes.

Q. What I mean is, that would give the "Chicago" at the moment of collision what speed?

A. At zero speed.

Q. She would be stopped in the water?

A. Yes.

Q. How have you placed the "Silver Palm" in this last exhibit?

A. At position 2 the "Silver Palm" was placed at an angle of 45 degrees from the "Chicago," and then it was assumed that the "Silver Palm's" speed at position 2 was 11 knots, and at the beginning of the one and three-quarters minutes was $13\frac{1}{2}$ knots, an average speed of $12\frac{1}{4}$ knots, which for the one and three-quarters minutes gives an advance of 714 yards, and the "Silver Palm" was accordingly moved back at the angle of impact a distance of 714 yards to establish position 1.

Q. Then between the first two positions you moved each vessel back from the collision point, that put the "Silver Palm" in what relation to the "Chicago"?

A. That placed the "Silver Palm" 17 degrees on the "Chicago's" port bow, a distance of 980 yards.

(Testimony of Frank Barrows Freyer.)

Q. That placed the "Chicago" in what position with respect to the "Silver Palm's" bow, to one standing on the deck of the "Silver Palm"—what did the "Chicago" bear, I mean, on the "Silver Palm's" bow?

A. 7 degrees on the "Silver Palm's" starboard bow, with the "Silver Palm" on course 125 degrees.

Q. I did not get the degrees the "Chicago" would bear.

A. 7 degrees.

Q. I observe at the top of this sketch, Captain Freyer, you have drawn a course in red. What does that represent?

A. That was [761] an endeavor to show the conflict in the testimony of the "Silver Palm" as compared with that of the "Chicago," and the position was obtained by laying off from position 1 of the "Chicago" a line 168 degrees, which was the bearing of the "Chicago" as given in Exhibit 1 Cox, and then placing the course 156 degrees, the course Captain Cox of the "Silver Palm" said he was on.

Q. In this last part of the sketch you place the "Silver Palm" on course 156 degrees true?

A. Yes.

Q. Which was the course Captain Cox said he was on?

A. Yes.

Q. That would place the "Silver Palm" on which bow of the "Chicago"?

A. That would place the "Silver Palm" 18 degrees on the "Chicago's" starboard bow.

(Testimony of Frank Barrows Freyer.)

Q. So that if the "Silver Palm" had in fact been on course 156 true and if the "Chicago" had in fact been on course 350 degrees true, the witnesses on the "Chicago" would have had to have seen the "Silver Palm" on——

Mr. LILLICK: I beg your pardon——

Miss PHILLIPS: Q. (Continuing) —on which side?

Mr. LILLICK: Let the witness testify.

Miss PHILLIPS: I could not possibly lead Captain Freyer, he knows more in a minute than I do in a year.

Mr. LILLICK: That is a very leading question.

Miss PHILLIPS: I was trying to save a little time, but I will withdraw it.

Q. Captain Freyer, if the "Silver Palm" had in fact been on course 156 true, and if the "Chicago" had in fact been on course 350 true, from which side would the witnesses on the "Chicago" have seen the "Silver Palm"?

A. If the "Chicago" had been 16 degrees on the "Silver Palm's" starboard bow then the "Silver Palm" would have been 18 degrees on the "Chicago's" starboard bow.

Q. And the captain of the "Chicago" would have seen the "Silver [762] Palm" on which side?

A. On the starboard side.

Q. On the starboard side?

A. Yes.

(Testimony of Frank Barrows Freyer.)

Miss PHILLIPS: I will offer this in evidence as Government's Exhibit next in order.

The COURT: It will be received as U. S. Exhibit 26.

(The plot was marked "U. S. Exhibit 26.")

Miss PHILLIPS: Q. Captain Freyer, looking again at your exhibit, and taking your first position in which you placed the "Silver Palm" on course 125 true, with her seeing the "Chicago" on the starboard, as you have in this, what change of course, if any, could the "Silver Palm" have made to avoid a collision? Have you got your dividers here, or your navigational instruments?

A. Yes. The "Silver Palm" should have changed course to either—a change of course, as shown in this plot to either port or starboard by the "Silver Palm" would have avoided the collision, if the change in course had been sufficient.

Q. Suppose you take some tactical diameter for the "Silver Palm," take any one that you think a possible one, I do not care what you do, and illustrate to the Court what could have happened in the event that the "Silver Palm" had put her rudder, let us say right rudder?

A. If we assume that the tactical diameter of the "Silver Palm" is 1000 yards, which is almost double that of the "Chicago," and that her advance through the water was 150 yards before beginning to turn, the pencil line which I will mark A-B would have been her course.

(Testimony of Frank Barrows Freyer.)

Q. That is, that would represent a change of course by putting the rudder hard right and giving the "Silver Palm" a tactical diameter of 1000 yards and an advance of 150 yards before she begins to turn: Is that right?

A. Yes.

Q. Suppose her tactical diameter were less, say 600 yards.

A. Then her course would have been along the line marked A-C. [763]

Miss PHILLIPS: You may cross-examine.

Cross Examination

Mr. LILLICK: Q. Captain Freyer, you took the distance of 2500 yards used in your first diagram from the testimony of Captain Cox, did you?

A. More specially from Silver Palm Exhibit No. 1 Cox.

Q. And that was put in the record at the time Captain Cox's deposition was taken, as I remember it?

A. As I remember.

Q. I think not, I know you were not there when the depositions were taken, Captain.

A. No.

Q. From your own experience at sea, Captain, is it not extremely difficult to estimate the distance between you on one ship proceeding rapidly toward another ship, when that ship is rapidly coming toward you?

(Testimony of Frank Barrows Freyer.)

A. I think that those with training can make a fair estimate.

Q. Do you think you could make a fair estimate when the vessels are proceeding, one at 12 knots an hour and the other at 13½ knots?

A. You can estimate fairly closely whether a ship is 500 or 1000 or 1500 yards. Beyond say 1000 yards it becomes more difficult. It is still more difficult in low visibility.

Miss PHILLIPS: I want to point out, your Honor, that counsel now is proceeding beyond the limits of cross-examination.

Mr. LILLICK: Miss Phillips—

Miss PHILLIPS: Just a moment, let me state what I started to say. I offered the captain solely for the purpose of computing a chart from what Captain Cox said. I have not questioned Captain Freyer upon the method of computing distance or anything of that sort, not but what I know he could do that. Just in the interest of not protracting this case unnecessarily I am making the objection that this is not within the limits of cross-examination.

Mr. LILLICK: May it please the Court: On [764] cross-examination, when I am cross-examining a witness on a subject so involved as diagrams put in evidence before this Court which result in the conclusion that there could not have been a collision, at all, I certainly have a right to elicit from the witness an explanation that will enable the Court

(Testimony of Frank Barrows Freyer.)

to look at the diagram and come to a correct conclusion about it.

The COURT: As I understand, Mr. Lillick, the diagrams in this case have all been plotted from assumed data, and while there might have been an error on the part of the person who compiled the data—whether it was a difference of angle, etc., was not gone into with the witness, so the only thing we had on the direct examination was the plotting of this data, without reference to how the data was obtained.

Mr. LILLICK: But, your Honor, I am examining a witness put on the stand as an expert, who is qualified because of his being a navigator, because of his education.

The COURT: I do not understand you question the fact that he was a competent person to testify to what he testified to or make the plot he did; the other matter may be pertinent to the issue, but it is not cross-examination; it was not touched on the direct examination, and I presume you would have to call him as your witness for the purpose of getting that data.

Mr. LILLICK: I will be very glad to call him as my witness, if that be the only privilege the Court will give me, at the end of my cross-examination, when I will notify the Court and Miss Phillips that I am calling him as my witness.

The COURT: Of course, the situation is this: an objection was made, but where, as I say, the subject-

(Testimony of Frank Barrows Freyer.)

matter is pertinent to the inquiry as to the possibility that the witness, whose testimony I have not yet read, may have erred in the time or the distance, etc., why he should have erred and how it would have been possible for him to err, I think that is something that you will have to bring out as your own testimony, in view of the objection of Miss Phillips.

Miss PHILLIPS: Your Honor, I can see we are going to run into tomorrow now. I could have finished the case this afternoon.

Mr. LILLICK: May it please the Court, I am unconcerned whether we finish this afternoon or next month. I must try this case in order to bring before the Court facts which will be understandable.

The COURT: The ruling is you are exceeding the scope of cross-examination at this time, and the objection will be sustained.

Mr. LILLICK: Q. Captain Freyer, from your own experience you are able to tell me, and perhaps without even computing it, over how many feet a vessel will proceed in one minute at a rate of 12 knots per hour. Do you know it off-hand, without figuring it?

A. 12 knots?

Q. Yes.

A. 12 knots, 1200 feet.

Q. A vessel making 12 knots an hour is covering, in fact, as I understand it 1215 feet per minute. Would you say that is approximately correct?

(Testimony of Frank Barrows Freyer.)

A. No, 1200 even.

The COURT: 1200 even?

A. Yes.

Mr. LILLICK: Q. So that in one minute if she makes 1200 feet, in ten seconds how much?

A. 200 feet.

Q. Now, if another vessel approached at $13\frac{1}{2}$ knots an hour, that would be roughly 225, or is that too much, in 10 seconds?

A. 225.

Q. Yes.

Miss PHILLIPS: Your Honor, I want to make the objection that counsel is proceeding in the face of the Court's ruling. [766]

Mr. LILLICK: This is direct examination, I am making the witness my own.

Miss PHILLIPS: Let me proceed and close my case, and counsel can then proceed.

The COURT: Cannot you conclude your cross-examination of the witness and then you can take that up later?

Mr. LILLICK: Yes, your Honor.

Miss PHILLIPS: I have made my objection and I will stand on my objection.

The COURT: I understand that Mr. Lillick is going to conclude his cross-examination.

Miss PHILLIPS: Let me go on and conclude my case and if counsel wants to call Captain Freyer as his own witness I have no objection. I think it

(Testimony of Frank Barrows Freyer.)

would be very helpful, but let us proceed in an orderly fashion.

The COURT: I understand he is going to do so, that he is going to proceed with his cross-examination.

Miss PHILLIPS: I have not closed my case. I have a right to close my case.

Mr. LILLICK: I have not finished my cross-examination.

The COURT: Mr. Lillick is going to finish his cross-examination.

Mr. LILLICK: I notice on the chart that has been put in evidence that each of them has times. I will read one speed of the "Silver Palm," at 8:11 13.5 knots. Those times were all taken from the testimony of the officers, were they, or were they given to you?

A. That was testimony that was given as to the speed of the "Silver Palm." My recollection is that the testimony of the engineers especially was that she was making 108 revolutions, which corresponded to 13.5 knots just prior to the vessels sighting each other. [767]

Q. Your computations on these charts were made from the testimony of the officers of the "Silver Palm," were they?

A. Yes.

Q. Do you remember that Captain Cox testified that when he first had the hull of the "Chicago" and her superstructure in full sight to come to any con-

(Testimony of Frank Barrows Freyer.)

clusion as to her course she was about 1800 yards or a mile away?

Miss PHILLIPS: Just a minute, the witness has testified that he used the exhibits of Captain Cox which are now spread out on this table.

Mr. LILLICK: Just a minute ago he said he used the testimony.

The COURT: Q. Did you use anything besides these three exhibits, or did you read the testimony?

A. I read the testimony of Captain Cox, but these exhibits were used in making these plots.

Q. In other words, in every situation depicted on these plots you assumed it on the basis of the data you found on these three exhibits, 1, 2, and 3 Cox?

A. With the exception of the speed of the "Silver Palm."

Q. Where did you get that?

A. That was taken from the testimony of the officers of the "Silver Palm."

Mr. LILLICK: May I have the question read?

The COURT: Read the question.

(Last question repeated by the reporter.)

Miss PHILLIPS: I object to it on the ground the witness has already answered that question.

Mr. LILLICK: Am I to be precluded from cross-examining the witness when he said the diagram was made from speeds taken from the testimony that he has read and formed the basis of the diagram?

(Testimony of Frank Barrows Freyer.)

Miss PHILLIPS: I beg your pardon. The distances there were Captain Cox's. I think that is self evident on the exhibits.

The COURT. The witness has testified to taking the speed from [768] the testimony and not from the exhibits just now, so I presume he can inquire about the testimony that was given, because he said that he took it from the testimony. Can you answer the question?

A. My recollection is that Captain Cox did so state in his deposition.

Mr. LILLICK: Q. Do you not remember also that Captain Cox, as to Exhibit No. 1 testified that "No. 1 is at 8:11 a.m. when I sighted what afterwards turned out to be the 'Chicago.' No. 2 is the cruiser 45 seconds later, when I determined the direction of the 'Chicago,' at the time when I gave one short blast. The first one is at the time of giving the three-blast signal. No. 3 is the angle at which the ships collided at about 8:13." Do you remember that testimony?

A. That is the gist of it. It has been some three or four months since I read it.

Q. Do you not also remember that he said the 45 seconds was an estimate of time?

A. I do not remember that specifically, but I would assume that to be the case.

Q. I read to you, Captain Freyer, from page 144 of Captain Cox's testimony, commencing at the bottom of page 143:

(Testimony of Frank Barrows Freyer.)

“Q. I hand you these sketches back, they are Nos. 1, 2, and 3, and will ask you to tell us what they are and we will then offer them in evidence.

“A. No. 1 is at 8:11 a.m., when I sighted what afterwards turned out to be the ‘Chicago.’ No. 2 is the cruiser 45 seconds later when I determined the direction of the ‘Chicago,’ at the time when I gave one short blast. The first one is at the time of giving the three-blast signal. No. 3 is the angle at which the ships collided at about 8:13.

“Q. You have spoken of an interval of 45 seconds having elapsed. Did you look at a watch or clock at that time, or is that only an estimate upon your part?

“A. It is an estimate of time, as far as I could judge, between giving the three-blast and my [769] giving the one blast, and giving the order ‘Hard a-starboard.’” That is the basis for the three diagrams of Captain Cox in connection with his testimony?

A. Yes.

Q. Captain Freyer, you have testified that in drawing your own diagram you took as correct the angles given, as I remember.

A. As given in these exhibits, 1, 2, and 3 Cox.

Q. There was a collision, in any event, so we cannot get away from the collision.

A. Yes.

Q. Now, leading up to the collision there are certain elements involved in a discussion of how it

(Testimony of Frank Barrows Freyer.)

occurred, and an angle or a bearing from a navigator is something that you would take as a comparatively accurate thing, would you not?

A. Within certain limits, of course.

Q. And as to time, where time is mentioned in deck and engine-room, time is comparatively accurate?

Miss PHILLIPS: Just a moment. I make the objection this is going beyond the limits of cross-examination.

Mr. LILLICK: I must explain the diagrams.

Miss PHILLIPS: The diagrams explain themselves. They have times on them.

Mr. LILLICK: That is why I am discussing time.

Miss PHILLIPS: The diagrams have time marked on them.

Mr. LILLICK: That is why I am discussing it.

Miss PHILLIPS: Captain Freyer said he took the diagrams and they have the distance, angles, and the time marked on them.

Mr. LILLICK: Am I to be precluded from comparing distance and time?

The COURT: Read the question.

(Last question repeated by the reporter.)

Miss PHILLIPS: I make the objection it is not proper cross-examination, I submit to your Honor. Captain Freyer said he took [770] these diagrams, which show the angle, distance and time, and charted them. Now Counsel is trying to get him to discuss what is correct.

(Testimony of Frank Barrows Freyer.)

The COURT: You arbitrarily took the times set forth on these diagrams?

A. I did.

Q. You did not try to get them from any other testimony?

A. I did not.

Q. You simply took arbitrarily the times set forth here?

A. Yes.

Q. And applied them to your plots?

A. Yes.

The COURT: I will sustain the objection.

Mr. LILLICK: Will the Court permit me a moment, and withhold your ruling?

The COURT: You may present your point.

Mr. LILLICK: My point is this, the diagrams are offered in evidence for a purpose, to show how incomprehensible the collision was, computed by the testimony of Captain Cox. If I am to be precluded from putting before the Court the reason for that, I will have to learn the rules of evidence over again, because in all of my experience I have been taught that it is proper cross-examination, where a witness has been put on as an expert, to ask him upon what he has computed this and then after that compare times, distances, and results.

The COURT: I think your statement would be correct if there was any question as to what he took as a basis of his computation. Of course, in your presentation you will try to show that the bases of the computations are erroneous, it is knocked out, but he simply has prepared these diagrams solely

(Testimony of Frank Barrows Freyer.)

and exclusively on the basis of certain data which he has arbitrarily taken, as I understand it; it may or may not be correct. You are going forward on the question as to whether the data which he assumed was incorrect. [771]

Mr. LILLICK: No, pardon me. I have not made myself clear. Captain Freyer has carried it forward to prove to your Honor that the collision was impossible by the use of these times.

The COURT: Assuming that these times are correct he has done that, but I think the question goes to show that these times are erroneous, not that his method of plotting them is erroneous. If it is not plotted right, you have a right to go into that, but as to the times, I do not think that would be proper cross-examination, because he has simply arbitrarily assumed the data from this diagram.

Mr. LILLICK: Your Honor will remember that the witness said in his direct examination that the angles or bearings were correct, and that was the reason of my question, What is the difference between the correctness of an angle and an estimate of time.

The COURT: My impression was that the witness said that it was more likely that where an angle was known that it would be more accurate than when there would be an estimate of distance on the part of someone giving him that data.

Mr. LILLICK: That alone would give me the right to cross-examine this witness as to what he meant as to a comparison of accuracy between them.

(Testimony of Frank Barrows Freyer.)

I am only striking at one thing. I am striking at this, that angles shown are correct if taken from what the witness says it is comparably, and times are correct if taken from what the witness has said comparably, and distances are impossible, and that is the reason for the whole situation, the distance covered by a vessel in a certain number of feet, and the captain is an expert and has the ability to answer. It would be impossible for us to otherwise meet a diagram of this character submitted to your Honor as a reason why this collision occurred. There is an explanation for it. [772]

The COURT: My thought was that it was introduced partly to show the inaccuracy of the situation as described by Captain Cox in the data which he had contributed in connection with his deposition. He is taking Captain Cox's data and applying it to a plot apparently to show it would not show a condition that could possibly have existed at the time of the collision. I do not see where he passed on the data of Captain Cox.

Mr. LILLICK: Because he took the record of the case with it, which I read to the witness a moment ago, in order to call to his attention that that was a basis for a part of his testimony. I have a right to use that on cross-examination.

Miss PHILLIPS: Counsel said a moment ago couldn't he show that. Of course he can show that. He is trying to argue the case. Counsel can show the reason why Captain Cox was mistaken or why estimates of distance could be wrong, but he is trying

(Testimony of Frank Barrows Freyer.)

to get the witness to plot these things according to these charts. As your Honor can see, here are the distances, times, and angles marked. The witness plotted them the way they were given by Cox, distance, angles, and time. On the next plot all he did was to change the distance, and the next plot all he did was to change the distance, and the next one. That is all he has done. He has taken angles and time in each case just the way that Captain Cox gave them. Now, Mr. Lillick is trying to argue with the witness whether or not Captain Cox could have made a mistake in this data or the other. I think that is not proper cross-examination.

Mr. LILLICK: Your Honor will remember that the three were followed by another diagram upon which a course of 125 degrees is laid out, that none of us had ever heard of that, at least on the side of the "Silver Palm," until a moment ago; I never heard of the course of 125. [773]

Miss PHILLIPS: The point that I make is this. Counsel has not cross-examined the witness so far on the points that the witness had testified to. Now, he may get to that point, but certainly so far, when the witness says he took these exhibits and he plotted them, it is not within the limits of cross-examination for him to ask the witness whether Captain Cox could not have made an inexcusable mistake about the time, an inexcusable mistake about the distance. All of those are proper for him to argue, but it is not proper cross-examination.

(Testimony of Frank Barrows Freyer.)

The COURT: On the fourth plot what were you endeavoring to do?

Miss PHILLIPS: That is the fifth plot.

A. The fifth plot was an endeavor to show the picture as generally testified to by the officers of the "Chicago," and then to place the position of the "Silver Palm" as related by the officers of the "Silver Palm," which shows that the courses and bearings are irreconcilable.

Q. In other words, you have not in any way desired to criticise the data but simply tried to graphically illustrate how that data would appear upon a plot of this kind?

A. Yes.

Q. In the last one you have taken the data as to the movements of the "Chicago" from the testimony of the officers of the "Chicago"?

A. The general testimony does not agree exactly as to the bearing upon which the "Silver Palm" was sighted by the officers.

Q. You are not endeavoring, as I understand it, to show any reason why any of this data might be inaccurate?

A. No, I merely have in that fifth exhibit run the "Chicago" back, and I started with a certain assumption of the heading of the "Chicago" at the point of collision, the angle of impact estimated by the witnesses of both the "Chicago" and the "Silver Palm," and moved the "Silver [774] Palm" back an estimated distance for one and three-quarters

(Testimony of Frank Barrows Freyer.)

minutes without any change of course in the "Silver Palm."

The COURT: Of course, there is this to be said, you testified to the possibility of an inaccuracy on the part of the person giving this data in distance as compared to angles. Read the last question.

(Last question repeated by the reporter.)

Mr. LILLICK: May I rephrase the question, and before doing so remind your Honor that the witness has testified that the diagram was drawn after taking into consideration not only the estimate of the distance made by Captain Cox and the diagram that he drew, but also his testimony, and that is what I wish to call the witness' attention to in preparing this diagram.

Miss PHILLIPS: Your Honor has already ruled upon this, and I think counsel is going back to what you ruled on. The diagrams there show in themselves angles, distances, and times, and Captain Freyer said he plotted those just as they were given in the diagrams, and he did say he read the testimony of Captain Cox, but he says he plotted those according to those diagrams.

The COURT: Q. As I understand it, Captain Freyer, you took the time which is indicated on each one of these diagrams as an arbitrary period between each one of these particular settings: That is correct, is it not?

A. Yes, as to these exhibits 1, 2, 3, Cox, but the last exhibit introduced had other times.

(Testimony of Frank Barrows Freyer.)

Q. Had other times to what extent?

A. This had a number of assumptions, your Honor; first the heading of the two ships at the moment of collision, the time between the positions 1 and 2, the course on which the ships were at positions 1 and 2, and the speed that the ships made between positions 1 and 2, which, of course, means the distance traveled in that time.

Q. You took that data from where?

A. With respect to the "Chicago" [775] that was taken as related by the witnesses of the "Chicago," except as to the angle that the "Silver Palm" was on the "Chicago's" port bow, which was on the other side.

Q. How did you do it?

A. It was an endeavor to bear up to an average these elements of time, given by the officers of the "Chicago," that is the time when the "Chicago" began to back until the collision was estimated by officers of the "Chicago" as between one minute and a half to two minutes. That was split to one and three-quarters.

Q. In other words, in this last one you attempted to take the story told by the officers of the "Chicago" and compare it with the story told by Captain Cox of the "Silver Palm" and make what you thought was probably the true situation?

A. No, it is only a possible situation.

Q. What you thought was the most probable situation with that data?

(Testimony of Frank Barrows Freyer.)

A. No, it was only a situation which might have occurred.

Q. The trouble is the last one covers a different field than the other.

Mr. LILLICK: I am unable to understand why my cross-examination should be limited, in an endeavor to put before the Court facts upon which the court can come to a reasonably correct solution of the problem.

Miss PHILLIPS: I think to shorten this I am going to withdraw the last exhibit. I thought it would help your Honor if you had been able to see an average of the time, distance and speed, from which your Honor could have computed variations. That is the only purpose. For instance, if you allow a different speed of the "Chicago" than nine knots your Honor could have made the computation; if you allow a different speed of the "Silver Palm" your Honor could have computed it, but if counsel objects to that I will withdraw the last exhibit.

[776]

Mr. LILLICK: I will not permit it.

Miss PHILLIPS: I will withdraw it.

Mr. LILLICK: It is offered in evidence, and I insist that it has made its mark upon the Court's mind, and that being true a withdrawal of the exhibit will leave me in the situation where unconsciously there has been a psychological effect on the Court that I have a right to controvert.

(Testimony of Frank Barrows Freyer.)

Miss PHILLIPS: I thought Counsel was objecting because the witness was assuming too much. The witness only took the testimony of other witnesses and plotted it. If counsel wants to cross-examine on what other elements he took I have no objection. I will withdraw it. I thought it would be very helpful to the Court.

The COURT: I am not entirely satisfied that is what he did. The purpose, as I understand it, was with all of the data which was available to explain a possible solution of the accident, was it not?

A. Yes, your Honor.

Q. In other words, it is kind of taking all of the elements together and then where there are inconsistencies trying to smooth them out so as to, if possible, depict what occurred upon that collision?

A. I might say in answering that, I sat as a member of the Court of Inquiry which heard the testimony given in this case, and as the testimony was developed it was difficult to understand—

Mr. LILLICK: Might I be pardoned for interrupting, it is quite objectionable.

The COURT: I want to know what this is, in fairness to you, because I presume that what the witness is saying is probably along the line that you desire to contend for. In other words, you were trying to help the Court by showing a synthetic picture [777] of what occurred in so far as possible?

A. To assist the court.

(Testimony of Frank Barrows Freyer.)

Q. And it would be persuasive to the Court that in this way in all likelihood you contend that the collision occurred?

A. No.

Q. It is not supposed to aid the Court to that extent, then. Then what value is it?

A. It was an endeavor to show a picture as related by the officers of the "Chicago" and at the same time to place the "Silver Palm" where her officers said she was, from which it will be seen that the testimony as to courses and bearings is irreconcilable.

Q. I am not thinking of that, but is it supposed to show what is a true picture of this affair?

A. I had not that intention. The intention was merely to show to your Honor that there was inconsistency in the testimony which could not be true; that if all this testimony is accepted as true that—

Q. (Interrupting) I don't know as we need to speak about that, but was not to truly depict what might have transpired?

A. No.

Q. Your belief as to whether or not you could humanly work it out, you did not even want to work that out, did you?

A. I am still wondering, your Honor, how the collision occurred.

The COURT: I don't know as that will help the Court out very much, then.

Miss PHILLIPS: May I be heard on that? I thought if your Honor took this diagram your

(Testimony of Frank Barrows Freyer.)

Honor could use it to make recomputations on all of the elements involved.

Mr. LILLICK: It seems to me that I have a right to cross-examine Captain Freyer on the diagrams that are in evidence. The last question to which I addressed myself—

The COURT: Mr. Lillick, I think on the first four plots of Miss Phillips where the witness used nothing but an arbitrary collection of data you would be in an awful position to say you could inquire as to the accuracy of that data. The only thing [778] he did was he accepted the data and plotted it to show where the vessels would be if that data was accepted. Now, when it comes to this latter plot, I don't know where I find myself, because instead of being an attempt to show the Court what actually took place, it is merely an attempt to show the Court the inconsistency of the testimony given by the Government's witnesses and the witnesses for the "Silver Palm," but it is not an attempt on the part of Captain Freyer to give a solution of what transpired at that time.

Mr. LILLICK: That is also true of the other exhibits, because they all start with the collision and work back.

Miss PHILLIPS: No, they do not.

The COURT: The others are plotted from the data given by Captain Cox.

Miss PHILLIPS: They do not start with the collision.

(Testimony of Frank Barrows Freyer.)

The COURT: As to the question along the line you are following as to certain data being more accurate than others, etc., it seems to me that is in a different field from the examination of this particular witness, and I still cannot see from the presentation that was made in the record, as far as it is made, except that one statement he made that angles are more likely to be correct, that is from the general statement, than distance—outside of that general statement I do not think there is anything in the testimony—as to this, if there is I would like to have it pointed out to me. He has taken certain data and plotted it. In what way are you contending that any of the data is not right, either the data of the witnesses of the “Chicago” or the data on the part of the “Silver Palm”?

Mr. LILLICK: May I make this suggestion to the Court? We have arrived at the adjournment hour, and by tomorrow morning it may be that the reporter will have completed the direct ex- [779] amination of Captain Freyer, and we will then be in a better position to have a ruling on it.

Miss PHILLIPS: I think your Honor stated when we started this case that if a witness was on the stand and could be completed within a short time we should complete it.

The COURT: Mr. Lillick wishes to have the privilege of going over the record—that is his statement just made—to see whether there was testimony which went farther than what I have just stated. Isn't that correct?

(Testimony of Frank Barrows Freyer.)

Mr. LILLICK: That is exactly the point.

The COURT: We will take a recess until tomorrow morning at ten o'clock.

(An adjournment was here taken until tomorrow, Friday, March 30, 1934, at ten o'clock a. m.)

[780]

Friday, March 30, 1934.

FRANK BARROWS FREYER,

Cross-Examination (resumed)

Mr. LILLICK: May it please the Court, I think perhaps in the heat of yesterday afternoon it was a good idea that we took an adjournment until this morning. I withdraw the last question that I asked. I want to ask Captain Freyer only one further question.

Q. On one of the charts, Captain Freyer, you had a course laid down of 125 degrees for the "Silver Palm." You had nothing upon which to base that course in the testimony, had you?

A. None other than that might be deduced from the testimony as to the heading of the "Chicago" at the moment of collision, and the angle of impact worked back from that to place the "Silver Palm" on that course had there been no change in course.

Q. If she had been on that course?

(Testimony of Frank Barrows Freyer.)

A. If she had been on that course and there had been no change.

Mr. LILLICK: That is all.

Miss PHILLIPS: I have no further witnesses to call, your Honor, that is, in the case involving the navigational issues. I believe that the "Silver Palm" logs are not offered in evidence. Counsel could not offer them, but I think I can, so that the Court would have before it whatever records there are. May I have the logs?

Mr. LILLICK: Yes.

Miss PHILLIPS: I am now offering in evidence as Government's exhibit next in order the maneuver book or bell book—the maneuver book, I believe, is the English term for what we call a bell-book. I offer the entries on the page beginning October 23 and running through October 24, which is two pages. I think both of these pages were referred to by the officers in their [781] testimony.

The COURT: It will be received as United States Exhibit No. 27.

(The maneuver book was marked "U. S. Exhibit 27.")

Miss PHILLIPS: I will also offer in evidence the rough log of the "Silver Palm," the entries appearing on pages 183, 184 and 185, covering the dates of October 23 and October 24. I might say in that connection that I do not think the date of October 23 is particularly instructive, but I believe that that was referred to by the officers in their

(Testimony of Frank Barrows Freyer.)

testimony, and there will be no harm in having that considered by the Court.

The COURT: It will be received as United States Exhibit 28.

(The rough log was marked "U. S. Exhibit 28.")

Miss PHILLIPS: I will offer in evidence the page of the engine-room log, it is not numbered, but I think it covers from San Francisco to New Orleans, October 24, the entries for October 24.

The COURT: It will be received as U. S. Exhibit 29 in evidence.

(The log-book was marked "U. S. Exhibit 29.")

Miss PHILLIPS: We rest, your Honor.

DAVID W. DICKIE,

Recalled for the Silver Line, Ltd., in surrebuttal.

Mr. LILLICK: Q. Mr. Dickie, have you prepared a sketch showing the respective decks of the two vessels and the water line at the time of the collision?

A. Yes.

Q. There has been so much testimony, your Honor, with respect to the water line, and where the point of contact came, that I wish to have in the record a diagram showing the respective decks of the two vessels and the water line. Will you point on the diagram [782] to the water line, Mr. Dickie?

A. This is the water line, and the right-hand

(Testimony of David W. Dickie.)

picture shows the bow of the "Silver Palm", the fore-castle deck, upper deck, stringer, second deck, water-tight clear through the second deck, also back to here, and the stringer here and stringer here, and these vertical lines of the frames of the ship and appearing the way they are in the drawing. This sketch is a copy of the sketch which is already in evidence which was prepared by the Naval Constructor from Mare Island, and they are made to the same scale, and made in the relative positions.

Q. What portion of the "Chicago" does it show, a side view or a cross sectional view?

A. This is a cross section of the "Chicago," that is to say, the Naval Constructor from Mare Island described that as a cross section of the "Chicago" where he thought the place was that the accident occurred.

Q. Pointing to the compact line between the two diagrams, can you tell me whether that is intended to indicate the side of the "Chicago" or the bow of the "Chicago"?

A. That is intended to indicate the side of the "Chicago."

Q. In other words, it is like a straight cut off section of the "Chicago"?

A. Straight cut off section of the "Chicago."

Mr. LILLICK: I will offer that in evidence as Respondent's Exhibit next in order.

The COURT: It will be received as Respondent's Exhibit 25.

(The sketch was marked "Respondent's Exhibit 25.")

(Testimony of David W. Dickie.)

Mr. LILLICK: Mr. Dickie, I show you Respondent's Exhibit No. 18, which was a diagram drawn by you to indicate the "Silver Palm" looking down on her from above with the damage, and a diagram of the "Chicago" which is U. S. Exhibit 20, and ask you to put the diagram of the "Chicago" on the damaged portion as shown by Mr. Hague, who produced the diagram—I think it was Mr. Hague—and ask you to put them in the relative positions [783] as shown by the diagrams.

A. In the first place, according to my theory of how this accident took place, it is my opinion that the stem of the "Silver Palm" touched the "Chicago" at frame 12 at the start, and that the "Chicago" went ahead in the water and the "Silver Palm" went ahead in the water in such fashion until the stem of the "Silver Palm" came on the port side of the fore-and-aft heavy special tested steel supporting the handling room between the first and the second platform decks, and also a part of the stem came in contact with the port side of the fore-and-aft bulkhead, and crushed the stem of the "Silver Palm" on the lower part over to the starboard side, the damage continuing until the "Silver Palm" came up against the ammunition hoist. Then the vessels swung, due to the energy involved, until they came around to an angle of about 70 degrees or 78 degrees, somewhere along in there, that the "Silver Palm" kept on swinging to the right for about, I think the record shows, 40 or 45 degrees.

The COURT: Q. The "Chicago"?

A. The "Chicago" kept swinging to the right

(Testimony of David W. Dickie.)

I think about 40 or 45 degrees, and the "Silver Palm" kept swinging to the left for 165 degrees or almost a half circle, until she was swung around from a point in a southerly direction to a northerly direction. This accounts for all of the damage when you fit it together. There is a strong bulkhead at frame 231½, and all of this lighter plating, one-quarter-inch plating, piled up ahead of the movement of the ship, and acted as a cushion between the bulkhead 231½ and the starboard bow of the "Silver Palm," and that pushed the bow over to port.

Q. Of course, your plan this morning comes in the same line as the plan of the officer, Mr. Hague, the only difference being that you feel that this action was agumented by movement on the part of the "Chicago," and not lying at rest in the water?

A. Not ly- [784] ing at rest in the water.

Q. Now, then, in what way do you feel is shown the nature of the contact, we will say, what convinces you that there was a movement on the part of the "Chicago" in addition to that angular movement which came in on that direction, using that angle as testified to by you and by Officer Hague?

A. Supposing we assumed Mr. Hague's position, that the "Silver Palm" struck frame 17 and went straight in along that angle and that the "Chicago" was standing still, the stem of the "Silver Palm" would have come on the forward side of the bulkhead 2, this is an armored bulkhead, and this part of the "Silver Palm" which is now crushed over to

(Testimony of David W. Dickie.)

starboard by this bulkhead, instead of being crushed that way would have been crushed over to port by the athwartship bulkheads; in other words, this stem, instead of coming on this side of this bulkhead and being bent this way, would have been bent in the other direction, due to the action on this bulkhead, here.

Q. Only a difference between moving up this way and the angular movement?

A. No, I am holding the "Chicago" still and I am moving the "Silver Palm" straight along this line. It is an impossibility for the "Silver Palm" to swing that distance. Let me give you the exact distance. It would be an impossibility for the bow of the "Silver Palm" to swing 26 feet to starboard in that time because this accident was over in three or four seconds. You see, the "Silver Palm" was going ahead a certain speed per second when it came up against the side.

Q. I was figuring this way, it is true that he drew that arrow, but he afterwards struck it out.

A. I took it to strike this way.

Q. In the way you held it it struck there?

A. No, I was holding it that way on top of the center line of the "Silver Palm." [785]

Q. Your idea is that the very point of the stem struck the "Chicago"?

A. The very point of the stem struck the "Chicago," the edge of the deck of the "Chicago" at frame 12.

(Testimony of David W. Dickie.)

Mr. LILLICK: May I show you that photograph?

A. Which is at this point which I am marking with an "A" where the man is standing.

Q. Government's Exhibit what?

A. Government's Exhibit 2-D, that the stem of the "Silver Palm" struck at the point A alongside of where the man is standing. If we take it the other way and fit the "Silver Palm" where it belongs in the picture, which both the naval constructor and myself agreed was the final resting place of the ships, the area which I am marking with cross hatching on the drawing would be totally without any explanation of how the accident occurred, because the "Silver Palm" would damage this part marked with a red pencil.

Miss PHILLIPS: I think that is very confusing for the witness to mark it with red pencil, an exhibit which Captain Hague prepared with red marks meaning very specific things. It is going to be very confusing if the witness marks this exhibit with his own marking.

A. I will mark that in brown. If we move it and put the "Chicago" back on the point where the naval constructor put it, then for the "Silver Palm" to fit in the damage on the "Chicago," it would have to move in a transverse direction of $16\frac{1}{2}$ or 17 feet. That should swing by actual tests three feet in five seconds. Now to swing 16 feet would take 26 seconds, and the collision in a fore-and-aft direction was all over in three or four seconds, because

the "Silver Palm" was going at 15 feet per second at the moment of collision, so that it is impossible to explain the collision on that theory; whereas it is quite simple to explain it if you put the "Silver Palm," the stem of the "Silver Palm" at the forward end [786] of the cut and let the "Chicago" come forward at the same time that the "Silver Palm" is going along, then the whole story fits in; the stem of the "Silver Palm" comes against the outboard side of the armored turret and you can account for every bit of damage shown in the photograph.

The COURT: Q. The only thing is, I can see where the movement might be augmented by two forces going in that direction, but you would not have the same result if the force was in that direction and still do that.

A. It would have exactly the same result if the "Silver Palm" had been moving this way, and from the fact that the "Silver Palm" has to come 16 feet, it would have to take 26 seconds of time to cover that space where there is only three or four seconds available.

Q. But you are assuming turning this way and I am assuming that the movement that it tore right through here.

A. Very well.

Q. In other words, you are assuming a movement like this?

A. Correct.

(Testimony of David W. Dickie.)

Q. I am assuming a movement like that.

A. Very well, if you assume a movement like that, putting the damage together, the line of the "Silver Palm" would follow along the line W-X, and the "Silver Palm" would be as marked "Second Deck" and the place between the port side of the "Silver Palm" and the line of cut of the "Chicago," there would be no force present to cause the damage.

Q. Are you assuming that the entry is here, or are you assuming that the entry is here?

A. No. In order to complete the damage the stem must fit into the place where the damage was, and unless we complete the damage that way we must have a situation at the center line of the "Silver Palm" so that the damage can be accounted for; and by placing the center line of the "Silver Palm" along the line W-X, the damage can be accounted for, [787] but the damage to the port side of the "Silver Palm," between the port side of the "Silver Palm" and the damage line on the deck of the "Chicago," is not accounted for by that, because this part of the "Chicago" would not have been injured at all.

Mr. LILLICK: Q. On United States Exhibit No. 2-D, take the portion of the port side of the "Chicago" from A to B.

A. The portion of the port side of the "Chicago" from A to B would have been undamaged under the theory that the "Silver Palm" went in along the line W-X.

(Testimony of David W. Dickie.)

Q. You mean if the "Chicago" had been at rest?

A. If the "Chicago" had been at rest.

The COURT: Q. Irrespective, in your opinion, of what angle of impact there existed?

A. No, the angle of impact existing must conform to the damage on both ships.

Q. Your point is this could not have been produced by any angle of impact whereby this could be accounted for, in your opinion?

A. No, there is no angle of impact that will produce the damage that occurred on the starboard side of the "Silver Palm" and on the port side of the "Chicago" forward of the "Silver Palm" at the same time. You can make one set of facts that will produce the damage to the forward end of the cut in the "Chicago" and you can make another set of facts that will produce the damage to the "Silver Palm"—to the forward end of the cut on the "Chicago," and you can make one set of facts that will produce the damage to the "Silver Palm," but the only condition that will account for both sets of damage is the condition whereby the "Silver Palm's" stem starts at Frame 12 on the "Chicago" and the "Chicago" goes ahead sufficiently to permit the "Silver Palm" to create the damage at the after end of the cut.

Mr. LILLICK: Of course, your Honor has not had the benefit of the testimony of the "Silver Palm." [788]

The COURT: I have read none of that.

Mr. LILLICK: So it is very difficult to understand.

(Testimony of David W. Dickie.)

Q. In connection with the question just propounded to you by the Court, I show you another diagram and ask you to relate that to the questions propounded to you by the Court.

A. This diagram merely illustrates the area which would be unaffected by collision whereby the center line of the "Silver Palm" is properly placed to create the damage to the after part of the "Chicago" and the bow of the "Silver Palm." This diagram merely illustrates what I was saying about W-X.

Q. If the "Chicago" had not been going through the water in a forward direction at the point of impact, what would have been the situation with respect to the shaded portion of this diagram?

A. The part of the "Chicago" represented by the shaded part of the diagram would not have been injured to that extent.

The COURT: Have you estimated the speed the "Chicago" must have had to have caused within the period that an accident of this kind, a penetration of this kind, could happen, that it could finally reach a point of rest in there? It is a matter of very brief time. Have you estimated that, as to what you believe?

A. We have that all worked out on the next diagram that is going in evidence.

Q. I did not know you had that. In other words, I would like to get what you estimate as the period that elapsed between the movement of the ship to the point where she came to rest from where you think she started to hit the side.

(Testimony of David W. Dickie.)

A. The "Chicago" came ahead about 30 or 32½ feet, somewhere in the neighborhood of four seconds. That would be about 8 feet per second.

Mr. LILLICK: Q. Can you translate that into knots per hour?

The COURT: In what period was that?

A. 32 feet in 40 [789] seconds, that is 8 feet per second. About 4.8 knots per hour.

Mr. LILLICK: We offer this last drawing as our next exhibit.

The COURT: It will be received as Respondent's Exhibit 26.

(The sketch was marked Respondent's Exhibit 26.)

Mr. LILLICK: Q. Mr. Dickie, have you prepared a diagram with the courses of the respective vessels and the bearings of the "Albion Star" and the times shown by the testimony with respect to the relative positions of the vessels as they approached each other and came into contact?

A. Yes.

Q. I hand you a diagram which you have prepared and ask you to explain it to the Court.

A. This is a diagram showing the position of the three vessels. The "Albion Star" was out to the starboard, and from the testimony of the "Albion Star" officer who gave his bearings on the "Chicago," and who gave his bearings on the "Silver Palm"—

The COURT: Q. Whose testimony is that?

A. The captain of the "Albion Star"; and he

(Testimony of David W. Dickie.)

gave his bearing of the "Silver Palm"; he likewise gave his true course as 335 degrees true, and gave his speed as 6 knots per hour during this interval.

Mr. LILLICK: Pardon me a moment. I would like to explain to the Court that the depositions of the officers of the "Albion Star" were taken and they, too, have not been read by the Court.

The COURT: No, that is the reason I asked, merely to have him refer to what testimony you took, and then, of course, it will be easy to find when the depositions are read.

A. The red figures on the drawing begin with zero and up to 120 seconds are numbered from the moment of impact of each ship, the "Silver Palm" from the moment of impact, from zero to 120 seconds, and the "Chicago" zero up to 120 seconds. This drawing was likewise made by taking the bearings which the "Silver Palm" had of the "Albion Star" and relating those bearings together and the [790] distance between them is given as a quarter of a mile somewhere in the record; I do not remember who testified to that. The plot of the "Silver Palm" is right along the line, to start with, of 160 degrees true, and the plot of the "Chicago" at the start is also along a line of 350 degrees true. The plot of the "Silver Palm" is taken from the tests that were made of the "Silver Palm" and have no mathematics in them whatsoever; that is the actual fact corrected to the displacement of the ship. 168 degrees is the angle which Captain Cox, of the "Silver Palm," testified to as being his angle at the

(Testimony of David W. Dickie.)

moment of impact. He afterwards swung around 165 degrees toward the left, from a southerly heading, through the east, and around to the north. The "Chicago" angle at the moment of impact is determined by the first mate, I think it is, of the "Albion Star," who took the bearing of the "Chicago" at the moment of impact, and said that the masts of the "Chicago" were in line; so that the angle 22 degrees true came from the testimony of the witnesses on the "Albion Star." The curve of the "Chicago," the steering curve, was taken from the tactical turning circle that was introduced in evidence, and the other curve from zero back to the 350 degree line was taken from the proper tactical turning circle for that part of the curve. The numbers in black, 10, 20, 30, 40 and 50 and 60 seconds, and the feet up to 1125 are taken from the tactical data of the "Louisville," which was introduced in evidence, and I think it was Admiral Simons said that you could put it on top of the tactical data of the "Chicago" and that it would fit absolutely.

Miss PHILLIPS: Might I interrupt just a moment? You are speaking about tactical data. I think we had better refer to the exhibits. Tactical data is rather a vague term. I think it would add very much to the witness' explanation. [791]

A. The turning circles that are used were taken from Government's Exhibit No. 4, and the distance in feet and seconds were taken from Government's Exhibit No. 5. Repeating, the numbers from zero marked on the drawing, where the "Chicago" went

(Testimony of David W. Dickie.)

emergency reverse, are given up to 60 seconds, and the corresponding feet from zero up to 1125 feet were taken from Government's Exhibit No. 5. The particular figures that I paid most attention to are the full speed astern to ship dead in the water 475 yards, estimated time 1 minute 55 seconds. I plotted a curve using these two figures and made a table to give me the speed in between.

Miss PHILLIPS: Just a minute. Counsel is now offering something in evidence that is not rebuttal. I offered a plot of the "Louisville" curve, which was put in week before last, in order to aid the Court. I am going to ask counsel to direct attention to what part of the testimony of Lieut. Hague, Professor Woods, or Captain Freyer the testimony of the last witness, in regard to the plot that he made, to which point is this testimony offered?

Mr. LILLICK: This is in rebuttal of the entire case made out by the Government in rebuttal of our case.

Miss PHILLIPS: Now, I am going to be very specific about this. This witness is now at this late date offering a plot of the "Louisville" curve. He did not say how he plotted it, I don't know whether it is by estimate or what. I deliberately did not offer evidence in my rebuttal the other day, because I did not think I was entitled to offer a plot by calculus of the "Louisville" curve which I had, because counsel had not raised that issue. They are offering at this time on surrebuttal something that I did not take up on rebuttal.

(Testimony of David W. Dickie.)

Mr. LILLICK: We will withdraw this then entirely, Miss Phillips. The chart itself, is based upon the testimony, and this was a part of the testimony before the court, except for this [792] point you are now making, as to the "Louisville" tactical data. I am a little uncertain about that, but let me withdraw it. Go ahead without reference to that, Mr. Dickie.

A. Then we plotted the times and the distance from this zero point back along the line until we come to this point 120 seconds from the point of collision. I then took the angle between the "Chicago" and the "Silver Palm" and the course in looking over the port bow of the "Chicago" is about 8 degrees, or about three-quarters of a point, and the course looking over the starboard bow of the "Silver Palm" is about 6 degrees, or about one-half a point. The only way I could account for the two-point bearing which the "Chicago" took over her port bow is from the testimony of Admiral Simons, I think, in which he said that the "Chicago" on occasions yawed from one side to the other, and her course had to be corrected to have her stay on her course of 350 degrees. That is the only explanation that I can make of the 2 point bearing is that the 2 point bearing was taken at some moment when the "Chicago" had yawed from the course that she was on and the simultaneous course taken from the compass was not observed at the same time. The distance between the ships now checks up just about as the testimony in the record.

(Testimony of David W. Dickie.)

The COURT: Q. Within that last minute, then, according to your drawing, the "Chicago" brought herself into jeopardy by turning to starboard?

A. Yes.

Q. Had she maintained her course she would not have struck the "Silver Palm"?

A. No, certainly not.

Q. In other words, the error, if there was any, was in the turn in the last minute?

A. Yes.

Q. In other words, it occurred within the last half minute?

A. Within the last minute. The "Silver Palm" started to swing—the "Chicago" started to swing at the point marked Zero, and the [793] record shows that the captain of the "Silver Palm" turned to his starboard the moment he observed the "Chicago" turning to her starboard.

Q. To port?

A. Turning to her starboard.

Q. This movement began about ten seconds—

A. (Interrupting) If you put a straight line on the other side of the center line you can see that the movement began right at this point, the zero point, where the "Chicago" emergency reverse was given.

Q. At that time there was not any possible danger of the two ships coming in contact?

(Testimony of David W. Dickie.)

A. No. The "Silver Palm" was up at the 72 seconds and was heading on course 156 true.

Mr. LILLICK: We offer this as our next exhibit.

Miss PHILLIPS: I am going to make an objection to the offer of this exhibit in evidence on the theory that it does not conform to the testimony, of either the witnesses of the "Chicago" or of the witnesses of the "Silver Palm," or of the witnesses of the "Albion Star." In other words, I think the record is going to show this exhibit is purely theoretical, showing what the ships might have done had they observed other maneuvers than they did observe, and had the witnesses testified other than they did testify. However, your Honor can reserve a ruling and have the exhibit properly numbered and we can talk about this in the argument.

Mr. LILLICK: I would rather have it decided now.

The COURT: It will be received as Respondent's Exhibit 27.

Mr. LILLICK: That is all.

Cross Examination

Miss PHILLIPS: Q. Now, referring to Exhibit 27, did you take the first position of the "Chicago" and the first position of the "Silver Palm," the respective positions of the two ships at the moment of sighting?

A. No. [794]

Q. What are they then?

(Testimony of David W. Dickie.)

A. Here is——

Q. You answer the question I put.

A. I answered it, no.

Q. Then what position are you taking? I am asking now of the position you marked as "Silver Palm," first position, and the first position of the "Chicago," at what point of time did you take that position?

A. The position of the "Silver Palm" is 120 seconds before the collision, and the position of the "Silver Palm" 120 seconds before the collision is the position of the "Silver Palm" when she sighted the "Chicago."

Q. All right. Now, then, what are you taking as the first position of the "Chicago"?

A. The first position of the "Chicago" is 160 seconds before the collision, and is the position of the "Chicago" coming up on a course of 350 degrees true.

Q. That is your first position of the "Chicago".

A. One moment, until I finish.

Q. That is before the "Silver Palm" sighted her, is that right?

Mr. LILLICK: If the witness has not completed his answer I suggest that he be allowed to.

Miss PHILLIPS: The trouble is he is not answering the questions I put to him. Go ahead.

A. When the "Silver Palm" sighted the "Chicago" the "Chicago" was at the position marked 120 seconds in red. When the "Chicago" came ahead to the position marked 72 seconds, the "Chi-

(Testimony of David W. Dickie.)

icago" sighted the "Silver Palm," and the corresponding position of the "Silver Palm" is shown on her course at 72 seconds.

Q. Then you have the "Chicago" traveling what distance between the time the "Silver Palm" sighted her and the moment of the collision? What distance are you having the "Chicago" cover?

A. 1365 feet.

Q. At the moment that the "Chicago" sighted the "Silver Palm," according to your exhibit, from which bow should the officers of the "Chicago" see the "Silver Palm"?

A. It should have been [795] from the starboard bow.

Q. From their own starboard bow?

A. Correct.

Q. Instead of the port bow?

A. Yes.

Q. As Admiral Laning, Admiral Simons, Captain Kays, Lieut.-Commander Minter, Lieut.-Commander Gray and the various lookouts sighted her: Is that correct?

A. That is correct.

Q. They are all wrong?

A. Wait a minute—

Q. You have already given your explanation.

A. The explanation of that is that Admiral Simons said the "Chicago" yaws in her movement through the water, and that is the only way that I can explain that they saw the "Silver Palm" over the port bow instead of the starboard bow.

Q. What does the term "yawing" mean?

(Testimony of David W. Dickie.)

A. It is movement of the vessel on her pivoting point from right to left as she proceeds through the water.

Q. Is there anything unusual in a vessel yawing as she proceeds?

A. On these high speed vessels they all do that.

Q. Is there anything unusual in a merchant vessel yawing?

A. Quite unusual in a steamer, because they have such a large fore and aft surface.

Q. Let us proceed to the next point, when the "Silver Palm," according to your exhibit, was at the point you have marked "Bow Silver Palm," when the "Chicago" first sighted her which side of the "Chicago" should the captain of the "Silver Palm" have seen at that moment?

A. He should have seen the starboard side of the "Chicago." I understand his testimony is to that effect.

Q. No, his testimony is the direct reverse, that he never at any time saw the starboard side of the "Chicago." That is one of the exact points I had in mind.

The COURT: That is argumentative.

Miss PHILLIPS: Yes, that is argumentative.

The captain [796] of the "Silver Palm testified, as your Honor will find, that he never at any moment saw the starboard side and that is one reason the court should reserve a ruling on this.

(Testimony of David W. Dickie.)

Mr. LILLICK: I do not want to leave their statement unchallenged, though I may be in error, after the "Chicago" had turned on the hard left rudder my recollection is that he said that the masts were out of line.

The COURT: This is argumentative.

Miss PHILLIPS: I make the objection on the ground I stated.

Q. From the time the "Chicago," on your diagram, sighted the "Silver Palm," what amount of time elapsed between that moment of sighting and the collision time, the time the "Chicago" sighted the "Silver Palm" and the time they hit, how many seconds?

A. 72 seconds.

Q. And during that 72 seconds the "Chicago" traveled at what rate of speed? You have it there in feet, or have you not?

A. An average speed of 11.2 knots, over the whole time.

Q. Over the whole time?

A. Yes.

Q. That is, in one minute and twelve seconds you were having her cover how many yards?

A. 1365 feet.

Q. 1365 feet?

A. Yes.

Q. At an average speed of 11.2 knots?

A. Yes.

Q. You are having her have what rate of speed at the moment of collision?

A. I think it was 4.7.

(Testimony of David W. Dickie.)

The COURT: He has already testified 4.8.

A. 4.8 came from the other diagram, but I think this is 4.7.

Miss PHILLIPS: Q. In order to achieve that average of 11.2 knots the "Chicago" at the moment of sighting had to have what rate of speed?

A. 12 knots.

Q. Are you sure about your figures on that? I do not mean to put you to a test in mental arithmetic, you understand. [797]

A. That is not a straight line, that is the curve that the "Chicago" comes down on. I know the admiral testified it was a straight line, but I do not believe that.

Q. No, he did not testify to any such thing.

A. I think he did.

The COURT: Let us not have any discussion.

Miss PHILLIPS: The trouble with the witness is he is interpolating his estimates of witness' testimony. You are having the "Chicago" cover 1365 feet between the moment she sighted the "Silver Palm" and when the collision occurred 1 minute and 12 seconds later, the "Chicago" traveling at very nearly 5 knots at the moment of collision: Is that correct?

A. That is correct.

Q. And in order to have that occur, according to your plot, the master of the "Silver Palm" would see the "Chicago's" starboard side between the point marked 72 on your diagram and as the "Chicago" moved along up to the time she turned right in order to get in the way of a collision: Is that right?

(Testimony of David W. Dickie.)

A. He would see the masts of the "Chicago" closing together for about 20 seconds.

Q. He could see the starboard side, is that right?

A. Yes, if he could see it at all.

Q. If he saw the ship he could see the side, couldn't he, if he saw the masts, couldn't he see the side?

A. He might have, but he said it was foggy.

Q. What distance are you having the "Silver Palm" cover between the moment of sighting 120 seconds before the collision and the collision?

A. 1781 feet.

Q. And you are giving her what rate of speed at the time of sighting?

A. $13\frac{1}{2}$ knots.

Q. You are giving her what rate of speed at the moment of collision?

A. I gave that in my testimony yesterday, I don't remember. [798]

Q. It was $7\frac{3}{4}$ to $8\frac{3}{4}$, roughly?

A. Yes, that is the figure.

Miss PHILLIPS: No further cross-examination, your Honor. The objection that I have made, I will ask your Honor to reserve the ruling until your Honor has had an opportunity to read the testimony of the various officers that the witness has testified to.

Mr. LILLICK: I think the record will show that it was based on the figures given in the testimony, and I am willing to have it submitted.

(Testimony of David W. Dickie.)

We rest, your Honor. Mr. Sawyer is here to present his case at this time.

Mr. SAWYER: If your Honor please, I have here copies of two bills of lading issued by the Silver Line, Ltd., covering the cargo of the two claimants for whom I appear, and in whose names a libel was filed against the United States. I served notice to produce the original on Mr. Lillick, and he has told me he has not got the originals, but I think there is no doubt that these are true copies.

Mr. LILLICK: I am willing to stipulate that the copies presented by Mr. Sawyer are true and correct copies of the original bills of lading.

Mr. SAWYER: And the Government, also?

Miss PHILLIPS: Yes, I have no objection to the introduction of copies.

The COURT: They will be received as Respondent's Exhibits 28 and 29.

(The bills of lading were marked, respectively, Respondent's Exhibits 28 and 29.)

Mr. SAWYER: I would like to make a statement with regard to these exhibits after they are marked. Both bills of lading show that the shipper was J. J. Moore & Company, Inc., of this [799] city, and both bills of lading are to the order of the shipper, with a notation to notify Messrs. Hillman Bros., in one case, and Messrs. Hayward, Young & Co., Ltd., in the other case. This being a court action against the Government, of course it is incumbent upon us to establish not an interest in the bill

(Testimony of David W. Dickie.)

of lading but actual ownership of the goods at the time of damage. We must also prove the passing of title from J. J. Moore & Co. to the libelants at or before the ship sailed. That proof can be supplied, and is formal in character, and Mr. Blair, of Moore & Company, will testify at any time that is convenient. I must go still further than that and show that these claimants are actual South African Corporations, organized under the laws of South Africa, and then further I have got to establish that there is reciprocity, that under similar circumstances the United States could sue a public vessel of South Africa, that is one of the elements of the Public Vessels Act. All of that proof, as I say, is formal in character. Miss Phillips and I are engaged in correspondence at the present time, through the medium of the State Department, to see if we can get the evidence which we know exists. I shall have to get certified copies, I presume, from proper authorities in South Africa to show the corporate character of the two corporations. I will have to put Mr. Blair on the stand to prove the passage of the title. All of these matters being purely formal I thought it was unnecessary to incumber this record. I understand depositions are going to be taken in England, and at any convenient time that testimony can be taken either before the Commissioner, if there is a reference, or, if there is no referenc, it can be taken in court.

Miss PHILLIPS: I think Mr. Sawyer's suggestion is an excellent one. I see no reason why he

(Testimony of David W. Dickie.)

should be obliged to put in at this time either evidence of ownership, evidence of corporate [800] identity, or evidence showing reciprocal rights of United States citizens to sue the Government of South Africa. It seems to me we can reach an agreement and save the Court's time. I think Mr. Sawyer is wrong in saying that depositions are coming from England in this case. The navigational case is now finished. Both sides have rested.

Mr. LILLICK: But the limitation case is not finished. We have not started that yet.

Miss PHILLIPS: I have no more evidence to offer on the navigational case. Mr. Sawyer's case on the navigational features depends on all of the evidence taken before your Honor. It is formal proof, and I will stipulate he may present it before the Commissioner at such convenient time as he desires.

TESTIMONY CLOSED.

Filed June 19, 1934. [801]

CHARLES ROBERT DEMER

called for the United States, sworn:

(Taken before Mattie G. Sterling, Notary Public, San Francisco, Calif., pursuant to stipulation of counsel.)

(Deposition of Charles Robert Demer.)

Miss PHILLIPS: What is your full name?

A. Charles Robert Deemer.

Q. What is your occupation?

A. I am a quartermaster third class, United States Navy, the "Chicago."

Q. To what ship are you attached, if any?

A. The U.S.S. "Chicago."

Q. How long have you been attached to the "Chicago"?

A. Since December 2, 1932.

Q. Do you remember the day of the collision between the "Chicago" and the "Silver Palm"?

A. Yes.

Q. Will you state whether at any time during that day you made a comparison of the clocks in the engine room with any other clock or time piece?

A. I did.

Q. Let us find out first, did anybody tell you to make that comparison?

A. They did.

Q. Who told you to make the comparison?

A. As I recall it was the quartermaster of the watch who got his instructions from the navigator.

Q. About what time so far as you recollect, did you make the comparison?

A. I could not say the exact time but I imagine it was between nine and ten o'clock.

Q. Tell us what you did.

A. The quartermaster gave me a comparing watch that had the correct time and I went down

(Deposition of Charles Robert Demer.)

and checked all the clocks in the engine room by that.

Q. A comparing watch you say. What do you mean by that?

A. That is just a watch that they have that gives the correct time of the chronometer, a watch set with the correct time from the ship's chronometer, and you carry the watch around and check the clocks.

Q. Did you go down in the engine room?

A. Yes. [802]

Q. What clocks, if any, did you compare with the time piece in your hand?

A. The two clocks in the forward engine room, one in the dynamo platform and two clocks in the after engine room.

Q. Then what did you do?

A. As I compared them I wrote down just how much each one was off with the correct time and put it on a piece of paper and took it up and turned it over to the assistant navigator.

Q. Did you keep that paper yourself?

A. No, I turned it over to the assistant navigator.

Miss PHILLIPS: That is all.

Cross Examination

Mr. LILLICK: Q. When did you get the order to compare the clocks?

A. I don't know the exact time, I imagine it was between nine and ten o'clock, it was quite a while after the collision.

(Deposition of Charles Robert Demer.)

Q. It was after the collision, in any event?

A. It was.

Q. Do you remember the name of the assistant navigator to whom you turned over the slip of paper upon which you had made the comparison?

A. Ensign Mallory.

Q. Do you remember whether, when you compared the clocks, they were all synchronized with the watch that you had, or whether there was a variation in the time?

A. There was a slight variation, some were a little slow and some were a little fast.

Q. By "a little" will you tell me what you mean?

A. Under a minute.

Q. Under a minute?

A. Yes.

Q. Do you know whether, when your watch was corrected or compared with the ship's chronometer, it was slow or fast for that zone?

A. No, the chronometer was set at Greenwich time.

Q. So that the chronometer from which your time on the watch was taken, was Greenwich time?

A. We have to apply corrections to it in order to get the correct time. [803]

Mr. LILLICK: That is all.

Miss PHILLIPS: That is all. [804]

LLOYD ROBERT GRAY,

called for the United States, sworn:

Miss PHILLIPS: Q. What is your occupation, Mr. Gray?

A. Lieutenant Commander of the United States Navy.

Q. How long have you been in the Navy?

A. About 26 years.

Q. Does that include your time in school?

A. It does.

Q. Are you a graduate of Annapolis?

A. I am.

Q. Are you attached to any ship?

A. I am attached to the "Chicago" as navigator.

Q. When did you join the "Chicago"?

A. September 12 or 18, I don't recall which.

Q. What year?

A. 1933.

Q. Will you please state the duties of the navigator?

A. As navigator I am responsible to the captain and under his direction for the safe navigation of the ship, for the steering gear, the steering equipment, compasses, chronometer, and all other navigational equipment.

Q. Did you see the collision?

A. I did.

Q. Where were you at the time?

A. I was in the pilot house standing next to the captain.

Q. On which side of the pilot house was that?

(Deposition of Lloyd Robert Gray.)

A. The port side of the pilot house looking out one of the two windows in the forward part of the pilot house, on the right hand of the captain.

Q. Mr. Gray, do you know on what course the "Chicago" was at 8 o'clock on the morning of the collision?

A. We were on course 350 true.

Q. How do you know the "Chicago" was on course 350 degrees true?

A. Well I took that course myself at the direction of the captain and I checked up the course being steered by observing the gyroscope repeaters on the bridge.

Q. What compasses did the "Chicago" have that morning, what kind [805] of compasses?

A. The "Chicago" has two gyroscopic compasses, one forward and one aft in the lower part of the ship, down in the bottom, and the gyroscopic repeaters are on the bridge and other places, there being two of them in the pilot house. In addition to that there is a magnetic steering compass which is in the pilot house, and a standard compass which is also a magnetic compass, above and abaft the pilot house.

Q. I wish you would explain to us more about the magnetic compass, the standard compass, the gyroscopic compass and the rest of them.

A. A gyroscopic compass is a mechanical instrument that depends on its directive force from the gyroscope which is a high speed wheel and whenever that wheel is off of the meridian it processes

(Deposition of Lloyd Robert Gray.)

back to the meridian, and in that manner maintains its direction in a true north. We have two such compasses on board.

The standard compass and the steering compass are both magnetic compasses. They depend upon their directive to the attraction of one end of the magnet of the compass toward the north magnetic pole. These two compasses are located, one in the pilot house for the use of the steersman when he is steering the ship, if such a compass is being used, and the standard compass which is also a magnetic compass is located in a position which is as free from magnetic material, such as steel or iron, as we can have it, and that location is above and abaft the pilot house. There is no steel in that, within I think it is ten or fifteen feet of the radius of that compass. That is the general practice.

Q. Mr. Gray, have you prepared a sketch of the bridge of the pilot house and chart house of the "Chicago"?

A. I had two sketches prepared under my direction.

Q. Is this one that I now show you?

A. Yes, that is the one of the navigation bridge.

Q. On what scale is this sketch prepared, I mean how many inches [806] to the foot or fraction of inches to the foot?

A. That is the one of the navigating bridge I believe you have?

Q. Yes, I am showing you what purports to be a sketch of the navigating bridge.

(Deposition of Lloyd Robert Gray.)

A. The scale is three-quarters of an inch to the foot.

Q. Does this plot show in it the location of the steering wheel, the gyro repeaters and the like?

A. Yes, there is the steering wheel itself, the steering compass, that is the magnetic compass, steering compass.

Q. May the record show the witness has just written on the binnacle the words in pencil "Steering compass"?

A. The binnacle is not a compass; the binnacle is merely a holder for the compass.

Q. The position of the steering wheel and the rudder angle indicator and the steering wheel, have been indicated. Mr. Gray, have you any opinion upon the condition of the "Chicago's" gyro compasses that morning whether they were accurate or inaccurate?

A. Yes, I have a very decided opinion.

Q. What is your opinion as to their accuracy?

A. From my experience in the past and on the "Chicago" I know that a gyroscopic compass is quite accurate, and it is accurate on account of its mechanical means of indicating your course and also due to the fact that the directive force is so much stronger than that of a magnetic compass—the magnetic compass on board ships, particularly naval ships where we have a vast amount of steel, is very much diminished due to its reaction and as a result it does not seek its direction very well. The gyroscopic compass is used almost to the ex-

(Deposition of Lloyd Robert Gray.)

clusion of the magnetic compasses, due to the fact that they are accurate. I arrive at the fact that I consider them accurate because we have two separate and distinct gyroscopic compasses that are entirely independent of one another which read consistently the same; in other words, if we put the ship on any one course, both of those [807] compasses have read consistently alike.

Q. Now, with respect to your testimony to the conditions obtaining on the morning of October 24, did the gyro compasses read together or did they not prior to the collision?

A. They did.

Q. Have you any other reason for thinking that those compasses were correct?

A. On that particular morning and during the night before we had been proceeding up the coast from San Pedro on a series of courses in a fog, and the navigational information that I had which was received from a great many compass bearings and soundings, checked on our dead reckoning course reasonably true, reasonably accurate.

Q. Were there any other vessels operating in company with you during the 24 hours proceeding on October 24, the morning of October 24?

A. There were three other cruisers operating with us, and steaming astern of us, as we were coming up the coast.

Q. Do you know what the instructions were to the vessels astern of you as to courses to be pursued?

(Deposition of Lloyd Robert Gray.)

A. When the flag officer in command of the division establishes or sets a course, that course is given to the other ships of the formation, and should they note that by trailing us, which they did, that their track does not coincide with our, and that their ships' heading positions do not coincide with ours, then it is the duty of the ships astern to make it known that there is a possible error.

Q. Did you receive any such report from the ships astern of you during the 24 hours preceding 8 o'clock of the morning of October 24, that there was an error in the "Chicago's" compasses?

A. We did not.

Q. Did you at any time take any bearing by range finder during the 24 hours preceding the collision?

A. No.

Q. When did you leave San Pedro?

A. As I recall it, 9 a.m. on the morning of October 22. [808]

Q. On the 22nd?

A. The collision was on the day after we left.

Q. The collision was on the 24th?

A. That would place it on the 23rd then.

Q. Did you take any ranges or bearings during the 24 hours preceding the collision?

A. After departure from San Pedro the only navigational fixes which we were able to obtain were on passing Anacapa Island, Anacapa light, which was in sight, and from which we fixed our position.

(Deposition of Lloyd Robert Gray.)

Q. Did that fix indicate any error in the ship's gyro compass?

A. No.

Q. Did you take any navigational fix leaving port on the morning of October 23 at 9 o'clock?

A. We always do that, yes.

Q. Where from?

A. Well, as we passed buoys going out.

Q. Going out from what port?

A. Going out from San Pedro and Long Beach.

Q. Did you make any check of your compasses at that time?

A. I did. It is customary when we leave port to obtain our compass error, and we do that by taking an azimuth of the sun, if the sun is visible, and if not, by taking bearings of known ranges, and I took bearings on known ranges while leaving Long Beach and San Pedro Areas, to determine compass error and found none.

Q. And found none?

A. No.

Q. You say then at 8 o'clock the "Chicago" was on a course 350 degrees true. Was there any change of course made after 8 o'clock?

A. A few minutes after 8 o'clock we changed course to 330, 20 degrees to the left.

Q. Did you again observe the compass at about that time?

A. No.

Q. You say a change of course was ordered?

A. Yes.

(Deposition of Lloyd Robert Gray.)

Q. Will you please state the circumstances under which the change of course was ordered?

A. At about 8 o'clock a whistle signal [809] was reported ahead and the captain and myself proceeded to the pilot house from the chart house, and stood at one of the open pilot house windows listening. This whistle signal was on the starboard bow about one or two points, and we were approaching that signal, and the engines were signaled stop, and during the interval that the engines were stopped and the ship was forging ahead due to her momentum, a ship was observed on our starboard bow proceeding in approximately the same direction, or maybe a few degrees to the left of that. When it was seen that the ship on our starboard hand was more or less in our track, the captain ordered a change of 20 degrees to the left, from 350 to 330. Those were the circumstances of that change. It was in order to avoid that ship.

Q. Did you remain in the pilot house at that time, or did you go back to the chart house?

A. I remained in the pilot house from that point on for some time.

Q. Will you proceed to narrate and tell us what happened following the sighting of the steamer you have referred to, and an ordering of a change of course?

A. After we sighted the steamer and ordered the change of course, the captain ordered ahead two-thirds, which was followed by the order ahead standard speed. The ship was then swinging to the left in

(Deposition of Lloyd Robert Gray.)

order to clear the steamer, and I observed that this steamer, which I understand later to have been the "Albion Star" turned to the right as if to get out of our track. The last I observed the "Albion Star" she was perhaps broad on our starboard bow, that is about 45 degrees, and disappearing in the fog, at a range of perhaps, a distance of, I estimated about 1500 yards. When we had been on the standard speed a minute or two, or whatever it might have been, there was a report of a ship on the port bow and I believe, as I recall, I observed that ship at practically the same instant; that ship [810] developed rapidly, and the first thing that I saw of this ship was a big bow wave, as in a fog something that is white really stands out more than something that is dark. The ship on our port bow was between about a point and a half or two points on our port bow, and as she developed in appearance I observed that she was heading slightly across our bow, maybe as much as 10 or 15 degrees. The captain was standing beside me and his first order was "Hard left, no, no, full right," and that was spoken, those two orders were given within perhaps five seconds of one another, in other words, practically following one another, and that order was immediately followed by the order to back full, back full both engines emergency full speed astern. Prior to the collision, or I would say on the giving of that order full astern, the order was given to sound three blasts on the whistle, indicating that our engines were going full speed astern.

(Deposition of Lloyd Robert Gray.)

Q. You have not got to the collision point.

A. The ship on the port bow later identified as the "Silver Palm" appeared to me to be traveling at least 10 knots at the time, and at the time the collision occurred I estimated her speed still to be at least 10 knots, and her course appeared to me if anything slightly to the left, and our course was going right, and the "Silver Palm" hit us, rammed us forward of the No. 1 turret on the port bow and she plowed into us about up to the amidships line. When I observed there was no chance, there could not be anything else other than a collision, I went out on the port wing of the bridge, and with my hands on the rail I observed the "Silver Palm" plow into us.

Q. Mr. Gray, would it be possible for you to give us the exact distance the "Silver Palm" was from the "Chicago" when you sighted her?

A. No, that is not possible.

Q. Is there any special difficulty in getting the distance of an [S11] object under such circumstances?

A. It is very difficult; on account of the fog it makes it increasingly difficult, and when a ship first comes out of a fog like that, it is very difficult to say, and when your estimate comes first she appears more or less of a blur before you recognize her as a ship, and there is very little to compare distance with.

Q. Did you make any estimate of her distance from you at the time when you sighted her?

(Deposition of Lloyd Robert Gray.)

A. Not at the time. I did a little bit later in re-living it over the next few minutes.

Q. What estimate did you make of her distance from you a few minutes later, as you say?

A. Well, it is an estimate that is rather flexible. It might have been anywhere from 600 to 1000 yards. You could not pin it down any closer than that.

Q. Mr. Gray, you say that you heard the captain give the order, engines full astern, and three blasts sounded? Did you hear any signals from the "Silver Palm"?

A. None.

Q. I do not mean just at that time, I mean at any time that morning?

A. None prior to or at the time of the collision.

Q. How many signals did the "Chicago" blow after sighting the "Silver Palm"?

A. Three blasts for indicating full astern, but I am not certain about any other signals.

Q. Do you know whether the "Chicago's" engines were in fact put astern after the captain gave the order?

A. I did, because I observed the wash of the propellers boiling up around the stern of the ship to approximately amidships, and immediately at the time of the collision or immediately thereafter, the vibration of the hull showed the engines going rapidly astern.

Q. You referred to something about the wash of the propellers. Did you look over the "Chicago's" side at any time?

(Deposition of Lloyd Robert Gray.)

A. I did, yet. As soon as the collision occurred I looked down and saw the wash of the propellers had arrived from the stern up to about [812] amidships.

Q. What do you estimate the "Chicago's" speed was at the moment of collision?

A. Going ahead at a very small amount, probably from two to four knots.

Q. If the propeller water had, in fact, reached amidships prior to the collision, what would that indicate as to her speed?

A. Almost stopped.

Q. Do you recall looking over the "Chicago's" side to look at the water any other time other than that you have just referred to?

A. Oh, yes, plenty of times.

Q. I am not speaking of all the time you have been on the "Chicago", I mean on that morning between the time of sighting the "Silver Palm" and the time of the collision?

A. No.

Q. I wish you would describe how the two vessels reacted under the blow, so far as you can describe it.

A. The "Silver Palm" hit us making an angle of about 40 degrees with our bow, and as she was coming at considerable speed and hit us with all of her vast amount of weight, ripped into our decks and tore a hole in it; the "Chicago" heeled to starboard and took a heavy shock and she turned to right and the "Silver Palm's" stern swung to her starboard such that the two ships, immediately fol-

(Deposition of Lloyd Robert Gray.)

lewing the collision wound up in a position practically parallel to one another, both of them heading in approximately the same direction and at a distance of less than 100 yards.

Q. Mr. Gray, at the time the "Chicago" sighted the "Silver Palm" did you make an estimate of the "Chicago's" speed at that time?

A. What was that again?

Q. Did you, at the time you sighted the "Silver Palm" make an estimate of the "Chicago's" speed at that time?

A. Not at that time, no.

Q. Have you made estimates since then?

A. I have. [813]

Q. Did you make an estimate of her speed at the time that the naval court of inquiry sat, do you know?

A. Yes.

Q. What estimate did you make at that time?

A. As I recall, it was about eleven knots.

Q. What did you base your estimate at that time upon?

A. That estimate was based upon the times as reported in the engine-room bell record sheets, the times that the engines were stopped and put astern, or went ahead, or whatever it might have been, and using that as a basis, and the known orders for acceleration, that is for accelerating the engine revolutions for any given engine signal, using that as a basis and working from data that I had available from the "Louisville," which is a cruiser similar

(Deposition of Lloyd Robert Gray.)

to the "Chicago"—the data that I had from the "Louisville" was taken by that ship on anchoring, using speeds at 15 knots and slowing down at different bell signals—I used that as a basis for my estimate.

Q. Mr. Gray, did you in making this estimate, interview, or talk to any of the men on duty in the engine room?

A. No, not on duty in the engine room.

Q. You did not make inquiry as to what actual engine revolutions were, at any given time during this period of time?

A. No, I just used the written records, that is all I used.

Q. Mr. Gray, what time was used by the "Chicago" during that voyage from San Pedro to San Francisco?

A. We were using 120 meridian mean time.

Q. I will have to admit that I don't know what you mean when you say that.

A. Well, the time is taken using the motion of the earth and sun relative to one another as a basis; the relative motion of the two is not uniform, and therefore we can not build a clock which would keep time as compared to the sun, and therefore they build clocks which keep an average of the sun's time. That is [814] what the clock is. Now in order to have our clocks in any one neighborhood read the same, the earth is divided into zones, and the zone used in this locality is the zone of the 120th meridian, or a zone plus 8 as we call it, and that zone is

(Deposition of Lloyd Robert Gray.)

15 degrees wide and seven and a half degrees of range on either side of the 120 meridian, and that is the zone in which the ship was at the time, and also is the same time as is used in Los Angeles, San Pedro and San Francisco.

Q. Where did you get that time, how did you get it?

A. We carry three chronometers on board which are very accurate, and they are compared by radio time ticks with the time as given out by Washington, which permits us to compare our time with Washington time within less than half a second of error. And we take that time from our chronometers, correcting for the difference in range between here and Washington, which is three hours, and use that time as a basis for our time on board.

Q. Are clocks on board the ship set by the chronometer at any particular hour, is there any rule about that?

A. Not at any particular hour; once a day, and that is done in the forenoon, probably between 8 and 10 o'clock. I had one of the quartermasters go around with a watch which he has compared with the chronometer and correct all the clocks on the ship, and there are quite a number of them.

Q. Do you recall whether or not, on the 24th of October you ordered such comparison to be made?

A. I did. Within perhaps an hour after the collision I thought it wise to get the error of the various ship's clocks that had been used for recording data, and to get the error on them I directed my

(Deposition of Lloyd Robert Gray.)

chief quartermaster to get that data. Whether he took it himself or not I do not know, but the data was submitted to me and I made a memorandum of it at that time, noting the error of the engine room clocks and [815] the bridge clocks.

Q. Have you that memorandum now?

A. I think it is over on that table somewhere.

Q. I mean did you make a memorandum in your own handwriting?

A. I did.

Q. You did not make the comparison of the clocks yourself, though?

A. No.

Q. This was a comparison reported to you by whom?

A. By the chief quartermaster.

Q. By the chief quartermaster?

A. Yes.

Q. Mr. Gray, is there a sal log on the "Chicago"?

A. Yes.

Q. Did you look at the sal log at any time that morning?

A. No.

Q. What is the practice on the "Chicago" about checking the compasses, if there is a practice?

A. It is required that we determine our compass error at frequent intervals, and the practice is at least twice a day, and that error is determined by taking an azimuth of the sun. On that particular day and the day previous the weather was overcast

(Deposition of Lloyd Robert Gray.)

and foggy and the sun was not available at any time. Therefore the only comparison or check made of the compasses was made upon departure from San Pedro, or Long Beach by taking bearings on known ranges.

Q. What can you say as to the condition of the "Chicago's" steering gear and other navigational equipment?

A. The steering gear was in excellent condition. What other navigational equipment do you refer to?

Q. You referred to the fact that you, as navigator, were charged with the responsibility as to the steering gear and other navigational equipment, and I am asking you the question.

A. The other navigational equipment are the chronometers, as to which I checked the errors, the compasses, which I considered to be excellent, and our sextants, which we use for observation. [816]

Q. There is one question I have in mind: Did you pay any special attention to the "Albion Star" after the captain of the "Chicago" had ordered her to turn left?

A. I previously stated that the "Albion Star" turned away and disappeared into the fog on a bearing of about 45 degrees broad on the bow.

Q. Did you glance at her again or did you see her again after the time she disappeared?

A. I did not?

Q. You did not?

A. No.

(Deposition of Lloyd Robert Gray.)

Q. Mr. Gray, I am going to show you another plot. Will you look at this and tell me what it is?

A. That is a sketch of the flag bridge prepared under my direction.

Q. Is that a correct plot?

A. Yes, it was taken from the blue prints in the Navy Yard at Mare Island which constructed the ship.

Q. What about the plot of the navigation bridge?

A. The same that I did of the navigation bridge.

Q. What scale is the flag plot room drawn to?

A. The flag plot or flag bridge scale is two-thirds of an inch to one foot.

Q. Two-thirds of an inch equal to one foot?

A. Yes.

Q. You are writing that in your handwriting on the plot?

A. Yes.

Miss PHILLIPS: I am going to offer in evidence this plan of the navigation bridge and ask that it be marked Government's Exhibit 1-Gray.

(The plan of the navigating bridge is marked "U. S. Exhibit 1-Gray.")

And the plot of the flag plot room, as Government's Exhibit next in order.

(The plan of the flag bridge is marked "U. S. Exhibit 2 Gray.")

Q. Can you state the approximate latitude and longitude of the point at which the collision occurred?

(Deposition of Lloyd Robert Gray.)

A. I have it in my pocket somewhere. May I refresh my memory on the chart over there?

Q. Yes. [817]

A. The latitude was approximately 36-07 north, that is 36 degrees seven minutes north, and longitude was 122 degrees and 17 minutes west. That is the approximate location of it.

Miss PHILLIPS: That is all.

Cross Examination

Mr. LILLICK: Q. Will you explain what the sal log is?

A. The sal log is a mechanical instrument for determining the speed at which the ship is traveling through the water and it derives its determination from a metal tube which is projected below the bottom of the ship with a hole in the forward part of it such that as the ship goes ahead, the pressure of the water, due to the speed, forces water into that tube and creates a pressure in it, and through mechanical motion that pressure is translated into speed.

Q. Is there any attachment such as there is upon a barometer from which the mechanical recording is made that is permanent?

A. No.

Q. In other words, to use a sal log you must look at it from minute to minute to know what the ship is doing by the sal log?

A. That is true.

(Deposition of Lloyd Robert Gray.)

Q. And unless a man is stationed to take speed from it, it is of little use except as records are made from observation?

A. That is true.

Q. Was anyone stationed at the sal log, do you know, that morning between 8 o'clock and 8:07?

A. No.

Q. I think the sal log is sufficiently indicated upon one of the charts that you have introduced of the navigating bridge, is it not? Is it indicated upon that?

A. The sal log is located in the chart house on the after bulkhead. It is located back here, it is right back in there.

Q. The witness points to the aft end of the chart house.

A. Approximately at this location. [818]

Q. Where he indicates the position of the sal log. While you were in the chart house did you look at it at all?

A. I did not.

Q. Now as to the gyroscopic compasses, there were two in the pilot house, were there?

A. The gyroscopic compasses themselves are located down below, where they are protected; they are big heavy instruments and what we have in the pilot house are electrical repeaters of what the gyroscopic compass itself is doing.

Q. Is that in any sense what, upon a merchant vessel, is known as a metal mike?

(Deposition of Lloyd Robert Gray.)

A. No, the metal mike is an automatic steering device, it is not a compass.

Q. On the gyroscopic compasses on the "Chicago" was there any mechanical attachment that indicated the course by an arm or a projection with a pencil on it?

A. We had on board what is known as a dead reckoning tracer, and that has a pencil which travels along the chart in the direction in which your ship is traveling, and at a speed which is determined by the revolutions of the engine. It gives a track which will be more or less a true one, except due to any errors or wind or current.

Q. Mr. Gray, on merchant vessels I have seen a gyroscopic record that is so accurate that it traces the course of a vessel to even five degrees. Do you know the instrument to which I refer?

A. We have on the "Chicago" a course recorder, which, if it was in operation, would record the course that the ship was on at any given moment within accuracy of less than one degree.

Q. It was that instrument to which I referred. Did the Sperry gyro course recorder that was on the "Chicago" operate at all from the time you left San Pedro on that particular voyage?

A. No it did not; during the entire time that I was on board the "Chicago" I used it but once.

Q. So that it is not usual to operate with a Sperry gyro course recorder on the "Chicago"?

A. It had not been customary to [819] use it on the "Chicago".

(Deposition of Lloyd Robert Gray.)

Q. Is it not customarily used on other cruisers?

A. I don't know what the custom is, but it is something that would be of little help to me in navigating. It could be used largely as a check of the accuracy of steering of any particular helmsman. But as to giving you any other information it is not of a great deal of assistance, and on the "Chicago" when I relieved Commander Ash as navigator on that ship, he passed word along to me that the captain did not like it because it made too much noise, he had a lot of noises in the chart house anyway, and for that reason, after trying it out once myself and using it, I abandoned its use and did not use it at all.

Q. Had it been in use the morning of this collision we would have been able to have ascertained accurately the degrees to the left that the "Chicago" made when the course was changed from 350 to 330, would we not?

A. Yes. I will add in regard to that instrument that another reason why we did not use it is that it makes a record on a piece of paper, but that record does not come down into visible sight of us until almost an hour later, and that is an additional reason we did not use it.

Q. In other words, it is always used after an event to check with what the other records show, was done?

A. I did not use it at all.

Q. I meant of course when it is used?

(Deposition of Lloyd Robert Gray.)

A. That question is not quite clear to me. I can not give you a very good answer on it.

Q. You testified that when the "Silver Palm", with her great weight, struck the "Chicago" she turned the "Chicago" to the right. What was your estimate of the weight of the "Silver Palm" Mr. Gray?

A. About twelve thousand tons.

Q. And what was the weight of the "Chicago" at that time?

A. About the same, pretty close to 12,000 tons.

Q. How long had you been on watch after leaving San Pedro? [820]

A. I do not stand watch. I was on the bridge from the time we left San Pedro until the time of the collision.

Q. A part of that time you were lying down in the pilot house, were you not, Mr. Gray? In other words, you were not continuously on duty from the time you left San Pedro until the collision?

A. I did not lie down at any time. I was there all the time, available. I sat down but I did not go to sleep.

Q. On the previous day it is my understanding that you were unable to take an observation because it was either foggy or hazy, and that continued during the entire previous day, did it?

A. That is true.

Q. And that morning up to the time of the collision had you seen the sun?

(Deposition of Lloyd Robert Gray.)

A. I will alter that and say it was clear enough to see Anacapa as we passed, but the sky was overcast and the weather was hazy and foggy.

Q. I was not commenting upon your fix, I was only speaking of your ability to take an observation from the sun.

A. It was impossible to take any observation of the sun.

Q. Who set the speed of the "Chicago" at standard 18 knots when you left the formation that morning?

A. That I don't know. I don't know whether the captain set it or the admiral set it, I could not tell you.

Q. In any event, you were running, from the time you left the formation, twelve knots and then up to standard at 18?

A. Yes.

Q. Do you know how long prior to 8 o'clock you had attained a speed of 18 knots?

A. Well, we left the formation, as I recall, at 7:27 and it would take perhaps 15 minutes to work up to 18 knots under those conditions.

Q. Would it be a fair statement that in your opinion by 7:45 that morning you were running at 18 knots?

A. That would be a fair statement, yes. [821]

Q. And when the first whistle was reported to you, and the captain, from the "Albion Star" the "Chicago" was making 18 knots then, wasn't she?

A. Yes.

(Deposition of Lloyd Robert Gray.)

Q. Is it true that when that whistle was first reported the "Chicago's" signal to the engine room was two-thirds speed from standard?

A. As I recall it was two-thirds and then immediately followed by stop, all in the time of probably less than a minute.

Q. So that the first order was two-thirds, and then in something less than a minute the order stop was sent down to the engine room?

A. Yes.

Q. Would you give us your best estimate from recollection, without regard to what the engineer's bell book indicates, as to the time that elapsed between the two-thirds order about 8 o'clock, and the stop order?

A. No, I could not.

Q. Would you state it would be a pure guess on your part?

A. Yes.

Q. Let us take it from the time that you were standing with the captain as I understand you were, in the chart house,—

A. No, the pilot house.

Q. The pilot house, when the report came in to you of the whistle that had been heard on the star-board beam. Do you remember when the captain signaled to the engine room two-thirds speed, where he was when he gave that order?

A. Prior to the hearing or reporting of these fog signals, we were in the chart house, and when they

(Deposition of Lloyd Robert Gray.)

were reported we both proceeded to the pilot house.

Q. Was the two-thirds speed order given after you had moved out of the chart house?

A. Oh, yes.

Q. What I am trying to get is, where the captain was when he ordered two-thirds speed.

A. Looking out the window of the pilot house.

Q. And that order was given to whom?

A. That order was given to the officer of the deck. [822]

Q. And the officer of the deck in turn gave the order to whom?

A. There was a man standing by the engine telegraph and he executed the order. That is to the best of my recollection.

Q. That is all I want, Mr. Gray, just the best of your recollection. Where was the captain when he gave the stop order, was he in the same position as he was before?

A. The same position.

Q. You were beside him then, were you?

A. Yes.

Q. Were you standing at an open window?

A. At an open window, yes.

Q. Between the time that he gave the order two-thirds and the time of the stop order did you hear any whistles from "Albion Star"?

A. I do not recall that. We had been hearing the whistle of the "Albion Star"—well, I could not say

(Deposition of Lloyd Robert Gray.)

that either—we heard the whistles of the “Albion Star” after I came into the pilot house.

Q. And before the two-thirds order was given, do you mean?

A. Did you say before?

Q. Yes.

A. Oh, yes.

Q. How long would you think before?

A. That would be hard to estimate, a matter of a few seconds.

Q. Then after the stop signal was given do you know how long after that it was until the next order went down to the engine room?

A. No, not of my own knowledge. I know there was an appreciable time.

Q. I would like your best estimate if you are able to remember it, the best you can.

A. That is from the stop order?

Q. To the next order after that.

A. To the next order?

Q. Yes.

A. Well, it is very difficult to give you any estimate, due to just recalling the circumstances; I was seeing the time so much, that my estimates of those times is now practically based upon those records that I have seen, I imagine.

Q. In all fairness it would be impossible for you to recollect, and [823] I want to get your best recollection away from the records, if I can. Is it fair to say that, with your present inability to fix

(Deposition of Lloyd Robert Gray.)

the time, you are of the opinion that the engine bell book records would be a more accurate record of the times those orders were received in the engine room than your recollection of the orders from the bridge?

A. The average of those times would certainly be more accurate than any recollection I could give you.

Q. Using your phraseology, "the average of those records," is it that you say the average of the records to account for the variability due to varying individual quickness in executing orders and recording them: Is that what you mean?

A. That would account for part of it, and also the fact that those times are taken to the nearest minute, and therefore two people might read the same clock and might get two different readings at which either signal was ordered.

Q. In actual fact, dealing with different men, as a matter of fact, one man in the engine room at the throttle, a quick, nervous, temperamental man would be more apt to execute an order promptly than a phlegmatic, slow individual: that would be true?

A. That is possible.

Q. Will you give me your best judgment as to the speed of the "Chicago" considering that at 8 o'clock she was proceeding at 18 knots an hour, and from your recollection of the time that elapsed between the two-thirds order and the stop order and the next

(Deposition of Lloyd Robert Gray.)

two-thirds order, at what speed she was going at that second two-thirds order?

A. Well, my best estimate on that is, which I based, as I said once before, on taking the average time of the records, was between four and five knots.

Q. One of the reasons I have asked you, Mr. Gray, is because, on direct examination it was your testimony that, in your opinion, she was going at a rate of speed of from two to four knots at [824] the time of the collision. Working back from the time of the collision to the second order of two-thirds, the answer just given by you was at that time she was going between four and five knots an hour. Now if at that time she was going at between four and five knots an hour, and the two-thirds order ahead was given at 8:02.4, and 8:03.4 the standard speed was ordered, at what speed would you say the "Chicago" was going at 8:06?

A. About eleven knots. My estimate there is based upon the acceleration orders that they have in the engine room, which state that in increasing speed, that in any one minute for that boiler power, that they shall increase the revolutions of the engines five knots in the first minute, five knots in the second minute, and five knots more in the third minute, and every minute thereafter one more knot, which brings them up slowly, you understand, rather that brings them up quickly.

Q. Then if at 8:02.4 the engines were ordered two-thirds ahead, and at that time engines were at

(Deposition of Lloyd Robert Gray.)

a speed of approximately four knots, and one minute later, 8:03.4 they were ordered at standard, for the first time under two-thirds the "Chicago" would have increased at what speed would you say?

A. Immediately following that order the ship was still slowing down because the ship was slowing, due to her momentum, due to the negative acceleration, and in addition to that you have the drag of the propellers because the propellers are still turning over at a speed less than the ship is actually making; therefore they are acting as a drag. For that reason the speed of the ship must still drop off for perhaps half of that first minute after the two-thirds order is given.

Q. Under the circumstances that morning, bearing in mind that at 8 o'clock the engines were turning over at a rate of 173 revolutions per minute, wouldn't that have been somewhat compensated [825] by the coasting, if you wish to use that term, since they had been brought down then to two-thirds and then to stop?

A. I do not understand what you are asking.

Q. You have just stated that she would pick up slowly. She went down from 8 o'clock in the same relative degree, did she not?

A. No.

Q. Then with only minute intervals involved, is it not true that the action of the various men in the engine room is a very vital factor in the actual operation of the four propellers?

(Deposition of Lloyd Robert Gray.)

A. I still can not answer you. I can not understand what you are asking.

Q. With minute intervals involved as we are discussing now, the minute between 8:02.4 and 8:03.4 in your estimation, would not the action of the four men at the throttles in the engine room be a very vital factor in coming to a conclusion as to the speed?

A. Oh, sure, certainly.

Q. Let us assume that at 8:03.4 the engines were ordered ahead standard, and with your knowledge of what went on as you were on the bridge that morning, and assuming also that the next order was rung down to the engine room at 8:06, two and a half minutes afterward, can you give me your estimate of the speed of the "Chicago" at 8:06?

A. The only estimate that I have made, as I have said before, was based upon the average of the engine room times and known acceleration, and the "Louisville" data, and with that in view I did estimate that speed to be, as I recall it, around eleven knots.

Q. After you had the engines stopped, when you heard the "Albion Star's" whistles, what signals were blown on the "Chicago"?

A. There was a three blast, indicating that her engines were going full speed astern.

Q. May I remind you, Mr. Gray, that it is my understanding that after you heard the engines ordered to stop, after hearing the [826] "Allion

(Deposition of Lloyd Robert Gray.)

Star's" whistle, that signals were blown from the "Chicago" before the "Silver Palm" was seen?

A. Before the "Silver Palm" was seen?

Q. Yes, those are the signals to which I refer.

A. While we were proceeding, immediately prior to sighting the "Albion Star" we had been sounding one blast every minute, one prolonged blast, and as I recall, after the engines were stopped we sounded two blasts, and then following that, after the sighting of the "Silver Palm", three blasts, that the engines were going astern.

Q. That is what I wished to ask you about, the two-blast signal blown after the engines were stopped. Do you recall how many of those two-blast signals were blown?

A. I do not.

Q. Do you remember whether, after blowing two-blast signals, you went back to blowing fog signals before the "Silver Palm" was sighted.

A. As I recall it, we did.

Q. Can you tell me how many of those signals were blown?

A. No, I can not.

Q. In your estimate of the speed given when you testified before the court of inquiry, did you prepare a diagram of the situation then?

A. I did.

Mr. LILLICK: May I see it if you have it, Miss Phillips?

Miss PHILLIPS: I thought it was here, but I have sent for it.

(Deposition of Lloyd Robert Gray.)

Mr. LILLICK: Is the tachometer the same thing as the sal log?

A. That is part of the sal log.

Q. It has been called to my attention, for the reason that in the rough log appears, after the entry "0800, Pit log, no reading", and that pit log so referred to is a part of the sal log?

A. It is undoubtedly what he is referring to there. I will add, relative to that sal log, that it not only gives a direct reading as to the speed at the time, but it also gives a record of the [827] distance.

Q. In your estimate of 11 knots at the time the "Silver Palm" was seen, and using the engineer's bell record, how did you interpret those bell records with respect to time? That the throttle man had put down the time as the orders came over to the engine room telegraph, or that it represented the time that they executed the order on the engine, or the time they entered the record in the bell book?

A. I naturally assumed that that time that was entered there was the action of the engines.

Q. In order to make it certain the times that you used in making your computation of the engineer's bell book, was the average time of the four engines as I understand it?

A. That was the average time of the four engines, corrected for known error, the known errors which I ascertained by establishing the approximate error.

(Deposition of Lloyd Robert Gray.)

Q. And by known errors, you mean the clock errors?

A. Known clock errors.

Q. Did you sight the "Silver Palm" while the "Albion Star" was still in view, or rather still in your sight?

A. That would be rather hard for me to answer because I think she was, but I am not certain, she was just about,—one was fading out and the other was just about coming it.

Q. Were you looking at the "Silver Palm" when the order full astern was given on the "Chicago" if you remember?

A. Yes.

Q. Do you remember what time that was?

A. I do not.

Q. Do you remember how far away the "Silver Palm" was when that full astern order was given?

A. My estimate of the distance was about 700 yards, but it might be 200 yards up or down.

Q. As a matter of fact, with the fog, you said in your direct examination, it was very difficult indeed to judge the distance?

A. Yes. [828]

Q. We have had testimony, Mr. Gray, with respect to which way the "Silver Palm" seemed to change her course before the collision, and after she came into sight. I understand your testimony is that to you she seemed to be changing to the left of your course?

(Deposition of Lloyd Robert Gray.)

A. To her left, if anything.

Q. To her left; in other words, that her course was on a port helm instead of on a starboard helm?

A. No.

Q. Correct me.

A. You are perhaps confusing what helm is. In order to have a ship go to the left, her helm is right or starboard helm.

Q. I was assuming that direct orders were given to the helmsman, that is the reason. Let us put it differently. Am I stating it correctly that it is your opinion that prior to the time the "Silver Palm" and the "Chicago" came into collision, the "Silver Palm" seemed to be turning toward her left?

A. Toward her left if anything at all.

Q. When you first saw her, did her masts seem to be in line?

A. No, her masts appeared slightly open, just as though she was crossing our bow to a small extent, 10 or 15 degrees, perhaps.

Q. In other words, her foremast to the right and her after mast to the left?

A. As viewed from our position, that is correct.

Q. On the diagram No. 1 will you give me the difference between the flag speed indicator, and the speed indicator, if there be a difference. One is marked "Flag speed indicator" as I get it. I may be in error about that "flag speed indicator" and the other speed indicator. Is there any difference between the two instruments?

(Deposition of Lloyd Robert Gray.)

A. Yes. The speed flag indicator is a means that is always used in formation when we are with other ships. It is for transmitting an order. A man who is on the signal bridge, standing by a speed flag, whenever we make a change of speed he hoists a little signal which signifies to any ship [829] in sight of us, a naval ship, that we are traveling at a certain speed. This speed indicator on the port side of the bridge is the means of transmitting to the engine room the revolutions that were desired to have made by the engines.

Q. I think you said that you noticed that the "Albion Star" changed her course after you saw her. Which way did she change her course?

A. As I recall, to her right, in other words, to get out of our track.

Q. Would you say that you might have formed that impression because of your own change of course to the left and your having noticed later that she seemed to be bearing off to your right?

A. That is possible.

Q. Of course you don't know what course she was steering when you first saw her?

A. No, I do not.

Q. And as to all of these times you have no personal record of them?

A. I know the "Albion Star's" course perhaps within 10 degrees because she was on a course paralleling ours and crossing our bow to a small extent, perhaps 10 degrees, which would make her course probably 340.

(Deposition of Lloyd Robert Gray.)

Q. Can you tell me, whether, as navigating officer, and standing beside the captain as you were, the order to change your course from 350 to 330 and the order two-thirds speed and standard speed were intended to have you catch up and pass the "Albion Star"?

A. They were intended to avoid her and pass her, inasmuch as we were traveling at a higher rate of speed than she was; that is, we had been traveling at a higher rate of speed than she was.

Q. And to continue traveling at that rate of speed?

A. Yes.

Q. And that was your order, was it not, that morning, to proceed at standard speed of 18 knots?

A. The order was not given by me at all. I know we had been traveling at that speed.

Q. And they rang on that speed again?

A. And we undoubtedly [830] intended to continue on that.

Q. Can you tell me whether, when you sighted the "Silver Palm" you personally knew whether the course had been changed to 330 degrees, that is whether you finally had steadied up on that course?

A. I don't know that directly.

Q. Which followed the other, the order to change course or the order full astern?

A. The order full astern followed the order to change course.

Q. You personally don't know what time the actual impact occurred, do you?

A. No, I did not take any record myself.

(Deposition of Lloyd Robert Gray.)

Q. At no time during all this period from 8 o'clock until the collision did you look at a watch?

A. I did not look at any watch.

Q. Can you tell me when the order was given to the engineering force as to the use of the accelerating table that was in use that morning?

A. No, that is one that had been in use for some time, that is all I can say.

Q. You started from San Pedro that morning with a standard table of acceleration in the engine room?

A. Yes.

Q. So there was no specific order about it that day?

A. I believe that to be true.

Q. This again is an estimate; from your knowledge of the "Chicago" is it your opinion that if the "Chicago" was proceeding at 18 knots an hour and the engine room was signaled at 8:01 to stop, that the "Chicago" in two minutes would have lost 14 knots speed without any further order to the engine room?

A. Might I ask where you got those figures?

Q. I am simply assuming the time, Mr. Gray, a pure hypothetical question.

Miss PHILLIPS: I believe I will make an objection there. I do not believe that the witness is qualified to answer that. He is not an engineering officer and I doubt whether he has been [831] long enough on the "Chicago" to reach a conclusion that would be helpful to the court.

(Deposition of Lloyd Robert Gray.)

Mr. LILLICK: To save time I ask the witness for his answer for whatever it may be worth, in view of the fact that he was the navigating officer of the "Chicago" on that morning.

Miss PHILLIPS: I make the objection and the court can rule upon the objection.

Mr. LILLICK: Will you give me your best opinion?

A. Might I look at that sketch to refresh my memory?

Q. Certainly.

A. Might I remark before replying to that, that that does not tell all the situation as it existed?

Q. Answering your remark I base it upon nothing more than the assumption that I made that she was proceeding at 18 knots an hour and a stop bell rung to the engine room, and proceeding coasting, if you care to use that term, for two minutes, in your opinion, what speed would she be making at the end of two minutes?

A. I will answer your question indirectly, stating that my calculated estimate that I previously made is in three minutes after that stop bell I estimated that she had lost some 14 knots from 18 knots.

Q. So that in two minutes she would have lost how many?

A. In two minutes she would have lost approximately nine knots.

Q. In other words, would have been going at the rate of nine knots an hour at the end of two minutes?

A. Yes.

(Deposition of Lloyd Robert Gray.)

Q. Mr. Gray, from your experience on the "Chicago" would you be able to tell me approximately what time would elapse if the engines on the "Chicago" were running at 173 revolutions a minute before they would be reversing at 110 revolutions a minute?

A. If full emergency astern were rung?

Miss PHILLIPS: I think the witness is not qualified to answer that question and I make objection on that ground.

Mr. LILLICK: I am asking if he can tell me.

A. No. [832]

Q. The calculations that you made with respect to the speed were based upon data supplied to you from records?

A. Yes.

Q. Mr. Gray, at the hearing before the court of inquiry you were asked whether the "Chicago" was still swinging left when the "Silver Palm" was sighted and you there testified that yes, the steersman was meeting her with right rudder at that time. Reminding you of that, can you tell me whether you now remember that she was still swinging to the left?

A. I will state that my statement made at that time was based from information or from conversations that I had had with the steersman, as I recall it, to the effect that he was meeting her.

Q. From where you were standing you could not tell whether the "Chicago" swung one way or the other?

A. No, I would say no.

(Deposition of Lloyd Robert Gray.)

Q. Were you in a position to see what the helmsman was doing with his wheel?

A. No, I did not observe what he was doing with his wheel.

Q. At the hearing before the board of inquiry you testified with respect to the visibility from 8 to 8:10. I think you have not been asked that today. You then testified that the visibility was from 1000 to 2000 yards, the next minute 500 yards, when the "Silver Palm" was sighted, from 700 to 800 yards. Would you still say that is a fair statement of the visibility?

A. Yes, I would say so.

Q. Do you know the turning radius of the "Chicago" proceeding at 18 knots?

A. It all depends upon the amount of rudder that is used. On full rudder, what we call standard rudder for 15 knots it is 1000 yards, and standard half rudder it is 1000 yards, and at half rudder it is 1000 yards and standard rudder is 750 yards, and for full rudder is about 650.

Q. To put it briefly if you will give me an answer, if you can, to these questions, with full right rudder proceeding at a speed of 18 knots an hour, what is your estimate of the radius of [833] the circle that the "Chicago" would make?

A. The radius?

Q. Yes.

A. The radius is about 400 yards, in diameter about 800 yards.

(Deposition of Lloyd Robert Gray.)

Q. And the same question as to right rudder proceeding at 11 knots an hour?

A. Less than that, probably a radius of 325 and a diameter of 650.

Q. When was it as to distance from the "Silver Palm" that you first came to the conclusion that the collision was inevitable?

A. As soon as I observed her course and speed, which was as soon as the ship developed in form.

Q. Now as to distance, what would you say that distance was?

A. I should say that distance was 600 yards.

Q. And that was almost immediately after she came out of the fog?

A. In other words, as soon as she developed.

Q. In your opinion, Mr. Gray, if Captain Kays had not countermanded this order of full left rudder, would the ship not have passed the "Silver Palm" starboard to starboard without colliding?

A. No.

Q. If, without having ordered full left rudder he had ordered full right rudder, would the two vessels have passed port to port?

A. No.

Q. If, at the time you first saw the "Silver Palm" she was actually under a hard starboard rudder, is it not the only explanation of her seeming to turn to the left the fact that the "Chicago" herself was proceeding to the left of the "Silver Palm" bodily?

(Deposition of Lloyd Robert Gray.)

A. I can not answer that because I know of my own observation that the "Chicago" had the "Silver Palm" on her own port hand, and therefore such a situation could not have existed.

Q. Except for the fact, as I understand it, that where a vessel has an order full right rudder given her, she would bodily move over to the left, and a vessel the size of the "Chicago" sometimes to the extent of 50 yards—bearing that in mind, would you still [834] not say that the explanation is that the "Chicago" was moved bodily over to the port?

A. No, I would not say that. I could best illustrate that.

Q. If you would care to you may, otherwise I do not care to have you?

A. No.

Q. Mr. Gray, I hand you the analysis of the speeds of the "Chicago" when in collision with the steamer "Silver Palm" on October 24, 1933, or so described in the legend upon the blueprint, and ask you whether that is a blue print prepared from some sketches by you, taking into consideration the average speeds that you took from the engine bell book, and the tactical data obtained by you from the "Louisville," with such other data as you had in making this up, which you may give, if you care to, separately, of the position of the "Chicago" and her speed from time to time, and at the time of the collision?

(Deposition of Lloyd Robert Gray.)

A. That is true with the exception that you made mention of speeds taken from the engine-room bell book. If you state revolutions, that is true.

Mr. LILLICK: We offer the blue print in evidence as respondent's Exhibit 1 Gray.

(The document was marked "Respondent's Exhibit No. 1 Gray.")

Redirect Examination

Miss PHILLIPS: Might I ask you, there are corrections written in on the exhibit you have just offered. I want the commander to state whether he made those corrections. I do not want it said that somebody changed it afterwards.

Mr. LILLICK: I will be glad to have you do so.

Miss PHILLIPS: Mr. Gray, I observe at the bottom of this exhibit some figures written in red. Are those your figures?

A. They are.

Q. I just did not want it to appear that somebody else had made those afterwards. I have just one or two questions more, Mr. Gray. What [835] interval, if any, occurred between the order to the right after sighting the "Silver Palm" and the order to back? Can you, or can you not estimate the interval?

A. One immediately followed the other.

Q. You have said that you used data from the "Louisville" and other tactical data to make up this estimate. What other tactical data did you mean?

(Deposition of Lloyd Robert Gray.)

A. I do not recall just what it was at the present time, although I did use some other data.

Q. What tactical data, from the "Louisville" did you use?

A. Her curve submitted by that ship to other cruisers, of deceleration of the ship due to various slowing and stopping signals approaching an anchorage from a speed of 15 knots.

Q. I am still on the track of what other tactical data. Could you mean by that, tables of speed for engine revolutions, theoretical tables.

A. Oh yes, I would use them certainly.

Q. Would you have in mind too, standard acceleration and deceleration tables?

A. I had them in mind, too.

Q. I can not think of anything else that you might have had in mind. I wonder if you can think of anything else. Is there nothing else that occurs to your mind?

Mr. LILLICK: Ask him the question directly.

Miss PHILLIPS: I don't know. I can't think of anything else he could have had in mind.

A. I do not recall at the present time what I did use in addition to that.

Q. Do you know what signals were rung when the full astern order was given?

A. The engine telegraph.

Q. Whereabouts was the engine telegraph located on the plot?

A. It is immediately abaft where the captain was standing.

(Deposition of Lloyd Robert Gray.)

Q. How is the engine room telegraph rung down?

A. How is it rung? [836]

Q. Yes.

A. There are handles on there, that you swing back and forth sufficiently to ring gongs or bells in the engine room, and also a visual pointer that indicates what speed is desired, whether it is one-third, two-thirds, stop or full speed.

Q. It is a mechanical device?

A. It is a mechanical electrical device.

Q. Does it ring orders to both engine rooms simultaneously?

A. All engine rooms simultaneously.

Q. Mr. Gray, looking at this exhibit, your sketch, which is marked Respondent's Exhibit 1 Gray, I observe that you have on this the engine revolutions, which you have indicated were 150 revolutions ahead at the time about the full astern order was given. Do you know in fact the engines were going that much ahead?

A. No. That was taken from what was supposed to be the revolutions for a single speed; in other words, if standard speed is 18 knots, 173 revolutions, when they rang up standard speed would be 18.

Q. You said something about that you could make a sketch showing the movement of the ship when a rudder order is given. I am not going to ask

(Deposition of Lloyd Robert Gray.)

you to make a sketch unless you do not approve or agree with the sketches given in Knight in Seamanship on Plate 114, facing page 331 in the 8th edition. Is that what you had in mind when you said you could make a sketch?

A. That is part of what I had in mind.

Q. If you had anything more in mind I guess we had better have it.

A. I agree with the fact that a ship has a certain amount of relative motion to the left in making a right turn, but I do not agree that that makes the ship appear to be making a left turn, inasmuch as the line of the ship being such, even though the ship may turn somewhat to the left in making a right turn, still this ship here—

Q. Mark it “Silver Palm”. You are just pointing out there, and it will not show in the record.

A. That is not comparable to [837] the “Silver Palm” making a left turn in which her heading is left. What you were driving at was this, if the “Silver Palm” is there and we came in a movement to the left, it would make her open out this way, whereas, the “Silver Palm” being in that direction there, the relative motion of the “Chicago” slightly to the left is still on the port bow of the “Silver Palm.”

Mr. LILLICK: I understand that. Will you mark that “Silver Palm” and the other the “Chicago”?

A. Yes.

(Deposition of Lloyd Robert Gray.)

Miss PHILLIPS: I offer that in evidence as our exhibit next in order.

(The diagram is marked "U.S. Exhibit 3 Gray.")

Mr. LILLICK: Q. From where did you get the radio bearings about which you testified?

A. We obtained on the way north many radio compass bearings from Point Arguello which gave us a fairly accurate position off Arguello and rounding Arguello and Concepcion, and after that time we obtained radio compass bearings from Farallones, Pt. Reyes and Montara, which bearings are of little, very little, value because they do not cut sharply, and the distance is large, and furthermore those bearings are parallel to the coast, and when radio compass bearings are parallel to the coast their value is very much less, and their accuracy is considerably detracted from.

Mr. LILLICK: That is all.

Miss PHILLIPS: That is all.

(Certificate of Notary)

Filed March 27, 1934. [838]

MERLE JAMES VERICK,

called for the United States, sworn: (Taken before Erwin M. Cooper, Notary Public, San Francisco, pursuant to stipulation of counsel.)

Miss PHILLIPS: Will you please give your full name?

A. Merle James Verick.

(Deposition of Merle James Verick.)

Q. What is your business?

A. At present it is fire control man.

Q. In the employ of the city government, or what?

A. In the U. S. Navy.

Q. How long have you been in the navy?

A. It will be seven years this April.

Q. What is your present rank?

A. Seaman first class.

Q. How long have you been in that rating?

A. Since October, 1927.

Q. Are you attached to any ship?

A. Yes.

Q. What ship?

A. The U.S. "Chicago."

Q. How long have you been attached to the "Chicago"?

A. Since October 5, 1933.

Q. Were you on board at the time of the collision of the "Chicago" with the "Silver Palm"?

A. I was.

Q. Were you on duty?

A. I was.

Q. Where were you stationed?

A. On the bridge port fog lookout.

Q. What part of the bridge?

A. Port side.

Q. When did you go on duty?

A. About five minutes to eight.

Q. Did you see the collision?

A. I did.

(Deposition of Merle James Verick.)

Q. I would like you to go back and tell us what you saw, beginning about the time you came on duty, and tell us what you know.

A. I went on duty about five minutes to eight in the morning, and shortly after I went on watch the "Albion Star" was on our port hand, and the bow lookout reported it to the bridge, and as they reported it, a few minutes after they reported it I took about three steps back and I saw it, saw just part of the stern of it, and after that we made a left hand turn, I do not know what the degrees of the turn, or anything like that were, but we made a [839] left turn and right after we completed the turn the "Silver Palm" came in view; I do not know how far off she was at the time but she came in view and then we started backing down, and the "Silver Palm" at that time was making a left turn, because I could see her starboard side. I could not see her port side. At that time I glanced down at the water and I judge we were making about three or four knots, something like that, and after the "Silver Palm" came in closer, it was about 400 feet, I should judge, I looked down at the water again and we were at a standstill and it was not long then until she tore into us.

Q. You referred to the "Albion Star." What side of the "Chicago" was she on?

A. She was on our starboard side.

Q. I believe when you first related your account, you said on your port hand. Did you mean that?

(Deposition of Merle James Verick.)

A. No, the "Albion Star" was on our starboard side. The "Silver Palm" came on our port.

Q. You say when the "Silver Palm" was about 400 feet away, you think the "Chicago" was at a standstill. What makes you think so?

A. Because I looked down at the water and you could see the propellers had stopped then, and the rush of the water coming forward, it only comes up to about the center line of the ship, and it was up there.

Q. Do you know where the "Chicago's" propellers are located?

A. Yes.

Q. Whereabouts?

A. In the stern. There are two on each side; we have a propeller guard that is right over the forward propellers and after ones, just a little after that, and I judge it is about 40 or 50 feet from the stern.

Q. When was the last time you looked over the "Chicago's" side prior to the collision?

A. The "Silver Palm" was about 400 feet from us then.

Q. Do you know whether the "Chicago's" engines were in reverse? [840]

A. Yes.

Q. How do you know it?

A. Because you can tell by the vibration of the ship; right after we sighted the "Silver Palm" we started backing.

Q. Did you hear any whistles that morning?

A. Yes.

(Deposition of Merle James Verick.)

Q. What whistles?

A. Three short blasts, backing down.

Q. From what ship?

A. From the "Chicago."

Q. Did you hear any whistles from the "Silver Palm"?

A. I did not at any time. The "Albion Star," I heard her. That is the only one I heard.

Miss PHILLIPS: You may cross examine.

Cross Examination

Mr. LILLICK: Q. What time did the bow lookout whom you relieved, leave the bow?

A. I did not relieve the bow lookout, I relieved the port fog lookout.

Q. I am in error. I put it in my notes that you were the bow lookout.

A. Fog lookout on the bridge.

Q. On which side of the bridge were you standing?

A. On the port side.

Q. And directly in the wing?

A. Directly in the wing. There is a little corner there, I was right next to the corner.

Q. You relieved whom?

A. I relieved a fellow by the name of Shields, who has been discharged from the navy.

Q. You mean he had served out the full length of his enlistment?

A. No, he had a bad conduct discharge.

(Deposition of Merle James Verick.)

Q. What time did he leave the bridge?

A. Immediately after I got there, I judge it was five minutes to eight.

Q. So that he left the bridge at 7:55?

A. 7:55 would be all right.

Q. How many whistles did you hear from the "Albion Star"? [841]

A. I don't remember now. I heard her several times as she was passing, but I never heard any from the "Silver Palm."

Q. You stated you heard several from the "Albion Star" after she was passing. Did she come up and go by?

A. No, not after she passed. She passed right along, parallel with us.

Q. How far away was she?

A. I don't know, I would not say.

Q. You have given us the distance from the "Chicago" of the "Silver Palm" at one time.

Miss PHILLIPS: I beg your pardon, not at the time of sighting.

Mr. LILLICK: I have not finished my question.

Miss PHILLIPS: Withdraw it.

Mr. LILLICK: Q. (Continuing) —as 400 feet. Did you make no estimate of the distance between the "Chicago" and the "Albion Star" at any time?

A. At no time.

Q. Was the fog out in the direction in which the "Albion Star" was?

A. The fog was settling down pretty bad over the whole area where we were.

(Deposition of Merle James Verick.)

Q. So that fog was completely around the ship out toward the "Silver Palm", was it?

A. All around us, and we were in a bad place, I guess, that is all.

Q. With reference to the "Silver Palm" when you first saw her, did she look like a blur in the fog?

A. She did when she first came into view.

Q. That was because of the density of the fog, you did not see her come out of the fog bank all at once, but just gradually come out of a heavy fog?

A. Yes.

Q. Can you give me no idea of how far away she was when you first saw her?

A. I have no idea at all. If I would say I would probably be wrong either way.

Q. Do you know how long the "Chicago" is, what her length is?

A. She is about 585 feet. [842]

Q. Now speaking in terms of the length of the "Chicago", when you first saw the "Silver Palm" would you say that she was three times as far away as the ship length of the "Chicago" or five times her length away, measured in ship lengths?

Miss PHILLIPS: Just a moment. I am going to object to that. The witness has said he did not know, and certainly he is not qualified to answer a question such as you have put to him.

Mr. LILLICK: Q. Would you say that she was one ship length away?

A. I would not say either way, because I don't know.

(Deposition of Merle James Verick.)

Q. Then you are not willing to attempt to tell me of any estimate of ship lengths away?

A. No, I would not, because I would probably be over or under, and I would not say, because the chances are I would be wrong either way.

Q. You could tell me whether she was ten ship's lengths away, can't you?

Miss PHILLIPS: I renew the objection I have made.

A. I couldn't say, because in hazy weather it is hard to tell. You have got no good visibility.

Mr. LILLICK: Comparing the distance the "Albion Star" was away from the "Chicago" that morning, when the "Silver Palm" first came into your view, would you say that she was as far away then as the "Albion Star" was?

A. No, the "Albion Star" was closer.

A. The "Albion Star" was closer?

A. She was closer to us at the time we made our turn.

Q. At the time when you made the turn?

A. That is the nearest point was the time when we made our turn, that is the "Albion Star."

Q. You made that turn in order to get away from the course of the "Albion Star"?

A. Yes.

Miss PHILLIPS: Just a moment, this is not proper cross examination. I have not questioned the witness upon the course of the "Chicago" or upon the navigation or orders given to the helm [843] or anything of that sort.